United States
Department of
Agriculture

Soil
Conservation
Service

In cooperation with
University of Florida;
Institute of Food and
Agricultural Sciences;
Agricultural Experiment
Stations and Soil Science
Department; and Florida
Department of Agriculture
and Consumer Services

Soil Survey of Highlands County, Florida

How To Use This Soil Survey

General Soil Map

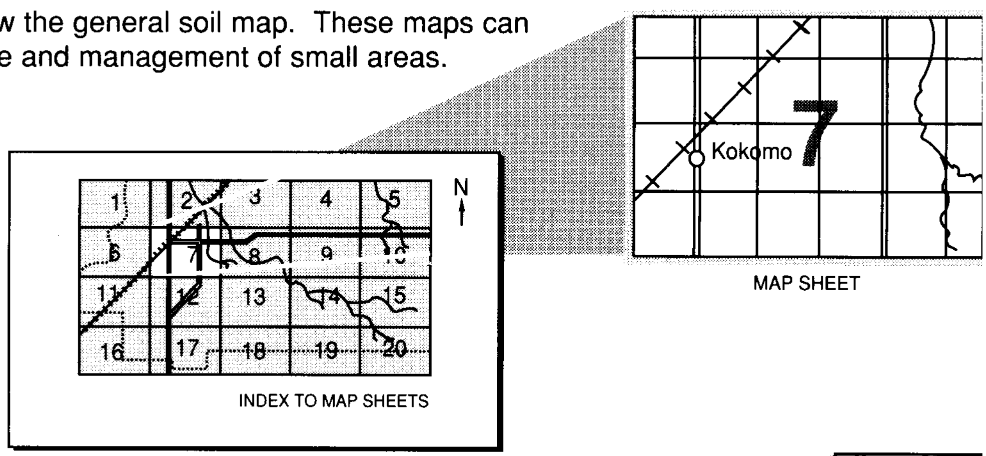
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

To find information about your area of interest, locate that area on the map, identify the name of the map unit in the area on the color-coded map legend, then refer to the section **General Soil Map Units** for a general description of the soils in your area.

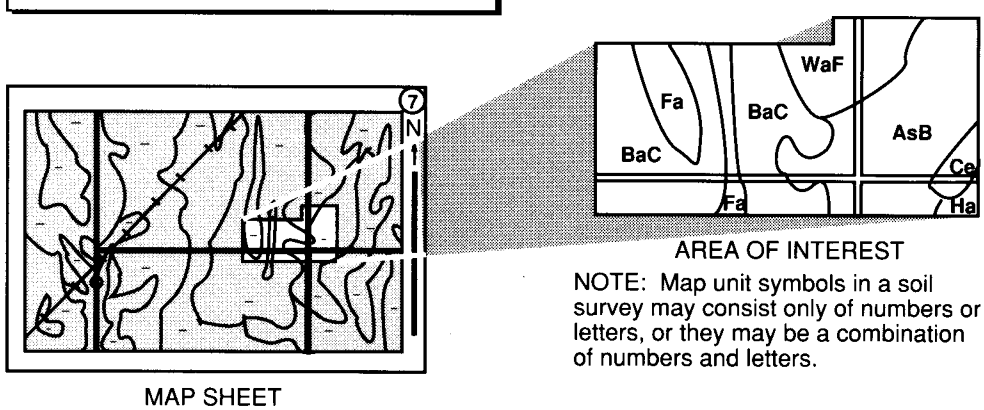
Detailed Soil Maps

The detailed soil maps follow the general soil map. These maps can be useful in planning the use and management of small areas.

To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



Locate your area of interest on the map sheet. Note the map unit symbols that are in that area. Turn to the **Index to Map Units** (see Contents), which lists the map units by symbol and name and shows the page where each map unit is described.



The **Summary of Tables** shows which table has data on a specific land use for each detailed soil map unit. See **Contents** for sections of this publication that may address your specific needs.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other federal agencies, state agencies including the Agricultural Experiment Stations, and local agencies. The Soil Conservation Service has leadership for the federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1986. Soil names and descriptions were approved in 1986. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1986. This soil survey was made cooperatively by the Soil Conservation Service and the University of Florida; Institute of Food and Agricultural Sciences; Agricultural Experiment Stations and Soil Science Department; Florida Department of Agriculture and Consumer Services; and the Florida Department of Transportation. It is part of the technical assistance furnished to the Highlands County Soil and Water Conservation District. The Highlands County Board of County Commissioners contributed financially to the acceleration of the survey.

Soil maps in this survey may be copied without permission. Enlargement of these maps, however, could cause misunderstanding of the detail of mapping. If enlarged, maps do not show the small areas of contrasting soils that could have been shown at a larger scale.

All programs and services of the Soil Conservation Service are offered on a nondiscriminatory basis without regard to race, color, national origin, religion, sex, age, marital status, or handicap.

Cover: Lake Simmons is a typical sinkhole-formed lake. The citrus crop in the background is on Astatula sand, 0 to 8 percent slopes.

Contents

Index to map units iv
Summary of tables v
Foreword vii
General nature of the county 1
How this survey was made 4
Map unit composition 5
General soil map units 7
Detailed soil map units 15
Use and management of the soils 49
Crops and pasture 49
Rangeland 53
Woodland management and productivity 56
Windbreaks and environmental plantings 58
Recreation 58
Wildlife habitat 59
Engineering 60
Soil properties 67
Engineering index properties 67
Physical and chemical properties 68
Soil and water features 69
Physical, chemical, and mineralogical analyses of selected soils 71
Engineering index test data 74
Classification of the soils 75
Soil series and their morphology 75
Anclote series 76
Archbold series 76
Astatula series 76
Basinger series 77
Bradenton series 77
Brighton series 78
Chobee series 78
Daytona series 79
Duette series 79
EauGallie series 80
Felda series 81
Gator series 81
Hicoria series 82
Hontoon series 82
Immokalee series 83
Kaliga series 84
Malabar series 84
Myakka series 85
Oldsmar series 85
Orsino series 86
Paola series 87
Pineda series 87
Placid series 88
Pomello series 88
Pomona series 89
St. Johns series 90
St. Lucie series 90
Samsula series 90
Sanibel series 91
Satellite series 91
Smyrna series 92
Tavares series 93
Tequesta series 93
Valkaria series 94
Formation of the soils 95
Factors of soil formation 95
Processes of soil formation 96
References 97
Glossary 99
Tables 107

Issued July 1989

Index to Map Units

1—Paola sand, 0 to 8 percent slopes 15
2—St. Lucie sand, 0 to 8 percent slopes 16
3—Basinger fine sand, depressional 16
4—Duette sand, 0 to 5 percent slopes 17
5—Daytona sand, 0 to 5 percent slopes........... 18
6—Tavares sand, 0 to 5 percent slopes........... 18
7—Placid fine sand, depressional 19
8—Immokalee sand 19
9—Astatula sand, 0 to 8 percent slopes........... 20
10—Myakka fine sand 21
11—Orsino sand, 0 to 5 percent slopes 22
12—Basinger fine sand.......................... 23
13—Felda fine sand 24
14—Satellite sand............................... 24
15—Bradenton fine sand 25
16—Valkaria fine sand........................... 26
17—Malabar fine sand........................... 27
18—Kaliga muck 28
19—Hicoria mucky sand, depressional 28
20—Samsula muck.............................. 29
21—Hontoon muck.............................. 30
22—Brighton muck 30
23—Gator muck 31
24—Pineda sand................................ 32
25—Chobee fine sandy loam, depressional......... 32
26—Tequesta muck 33
28—Archbold sand, 0 to 5 percent slopes 34
29—Pomona sand 34
30—Oldsmar fine sand 35
31—Felda fine sand, depressional 36
32—Arents, very steep 36
33—Basinger, St. Johns, and Placid soils 37
34—Tavares-Basinger-Sanibel complex, rolling 38
35—Sanibel muck............................... 39
36—Pomello sand, 0 to 5 percent slopes........... 39
37—Malabar sand, depressional................... 40
38—EauGallie fine sand 41
39—Smyrna sand............................... 42
40—Arents, organic substratum 42
41—Anclote-Basinger fine sands, frequently flooded.................................. 43
42—Astatula-Urban land complex, 0 to 8 percent slopes.................................... 43
43—Urban land 45
44—Satellite-Basinger-Urban land complex......... 45
45—Paola-Basinger sands, rolling 45
46—Kaliga muck, frequently flooded 46

Summary of Tables

Temperature and precipitation (table 1) 108

Acreage and proportionate extent of the soils (table 2) 109
Acres. Percent.

Land capability classes and yields per acre of crops and pasture (table 3)... 110
Land capability. Oranges. Grapefruit. Tomatoes. Watermelons. Bahiagrass.

Capability classes and subclasses (table 4) 113
Total acreage. Major management concerns.

Rangeland productivity and characteristic plant communities (table 5)....... 114
Range site. Total production. Characteristic vegetation. Composition.

Woodland management and productivity (table 6)......................... 119
Ordination symbol. Management concerns. Potential productivity. Trees to plant.

Recreational development (table 7)...................................... 125
Camp areas. Picnic areas. Playgrounds. Paths and trails. Golf fairways.

Wildlife habitat (table 8) 129
Potential for habitat elements. Potential as habitat for— Openland wildlife, Woodland wildlife, Wetland wildlife.

Building site development (table 9) 132
Shallow excavations. Dwellings without basements. Dwellings with basements. Small commercial buildings. Local roads and streets. Lawns and landscaping.

Sanitary facilities (table 10) 136
Septic tank absorption fields. Sewage lagoon areas. Trench sanitary landfill. Area sanitary landfill. Daily cover for landfill.

Construction materials (table 11) 141
Roadfill. Sand. Gravel. Topsoil.

Water management (table 12)... 145
Limitations for—Pond reservoir areas; Embankments, dikes, and levees; Aquifer-fed excavated ponds. Features affecting—Drainage, Irrigation, Terraces and diversions, Grassed waterways.

Engineering index properties (table 13) 151
Depth. USDA texture. Classification—Unified, AASHTO. Fragments greater than 3 inches. Percentage passing sieve number—4, 10, 40, 200. Liquid limit. Plasticity index.

Physical and chemical properties of the soils (table 14).................... 157
Depth. Clay. Moist bulk density. Permeability. Available water capacity. Soil reaction. Shrink-swell potential. Erosion factors. Wind erodibility group. Organic matter.

Soil and water features (table 15) 161
Hydrologic group. Flooding. High water table. Subsidence. Risk of corrosion.

Depth to water table in selected soils (table 16).......................... 164
Year. Month.

Physical analyses of selected soils (table 17)............................ 165
Depth. Horizon. Particle-size distribution. Hydraulic conductivity. Bulk density. Water content.

Chemical analyses of selected soils (table 18)........................... 169
Depth. Horizon. Extractable basis. Extractable acidity. Sum of cations. Base saturation. Organic carbon. Electrical conductivity. pH. Pyrophospate extractable. Citrate-dithionite extractable.

Clay mineralogy of selected soils (table 19) 174
Depth. Horizon. Clay minerals.

Engineering index test data (table 20) 176
Classification. Mechanical analysis. Liquid limit. Plasticity index. Moisture density.

Classification of the soils (table 21)..................................... 178
Family or higher taxonomic class.

Foreword

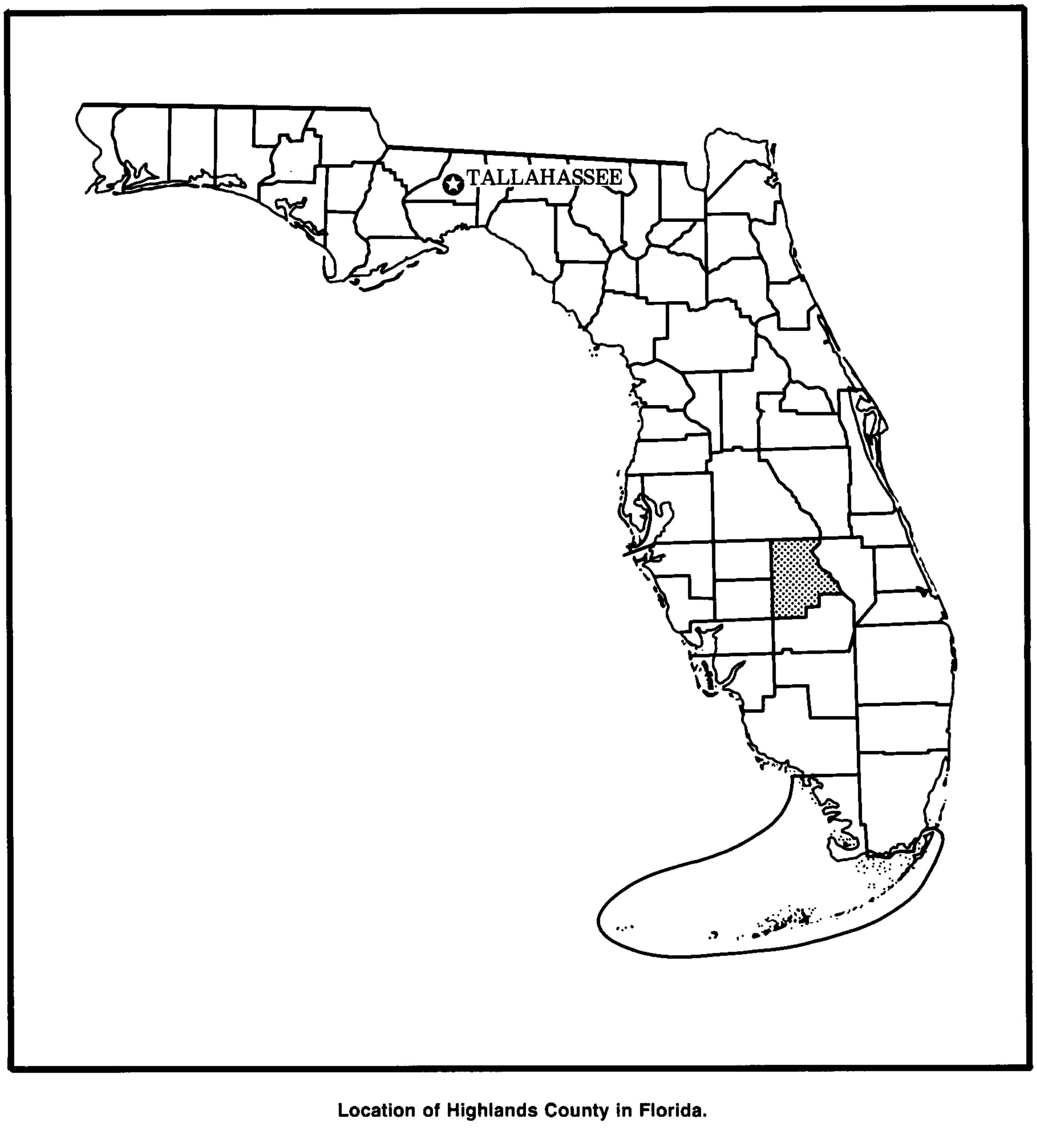
This soil survey contains information that can be used in land-planning programs in Highlands County. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

This soil survey is designed for many different users. Farmers, ranchers, foresters, and agronomists can use it to evaluate the potential of the soil and the management needed for maximum food and fiber production. Planners, community officials, engineers, developers, builders, and home buyers can use the survey to plan land use, select sites for construction, and identify special practices needed to insure proper performance. Conservationists, teachers, students, and specialists in recreation, wildlife management, waste disposal, and pollution control can use the survey to help them understand, protect, and enhance the environment.

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Soil Conservation Service or the Cooperative Extension Service.

James W. Mitchell
State Conservationist
Soil Conservation Service



Location of Highlands County in Florida.

Soil Survey of Highlands County, Florida

By Lewis J. Carter, Douglas Lewis, LeRoy Crockett, and Juan Vega, Soil Conservation Service

Participating in the fieldwork were Keith Wolff, Lynn DesLauriers, Dan Michael, and Debbie Prevost, Soil Conservation Service

United States Department of Agriculture, Soil Conservation Service, in cooperation with University of Florida; Institute of Food and Agricultural Sciences; Agricultural Experiment Stations and Soil Science Department; Florida Department of Agriculture and Consumer Services; and the Florida Department of Transportation

HIGHLANDS COUNTY is in the south-central part of peninsular Florida. It is bordered on the north by Polk County, on the west by DeSoto and Hardee Counties, and on the south by Glades County. The eastern boundary is the line of flow of the Kissimmee River.

Highlands County covers approximately 716,000 acres. Of this, about 658,310 acres is land area and the remaining acreage is large lakes that are in the ridge part of the county.

Citrus crops and ranching make up the base of the economy, and consumer services and retailing make up the remainder.

Sebring, the county seat, is in the northern part of the county.

General Nature of the County

In this section, environmental and cultural factors that affect the use and management of the soils in Highlands County are described. These factors are climate, history, physiography and geology, water resources, farming, and transportation.

Climate

The climate of Highlands County is characterized by long, warm, humid summers and by mild, dry winters. The average temperature in summer is 81 degrees Fahrenheit, and the average temperature in winter is 62 degrees F. The average rainfall is about 54 inches.

Table 1 shows data for temperature and precipitation as recorded at Archbold Biological Station in the period 1932 to 1984.

In summer, temperatures vary only slightly from day to day. They are tempered by cumulus clouds and rain showers during the late afternoon. The average daily maximum temperature is about 92 degrees, and the average daily minimum temperature is about 68 degrees. The highest recorded temperature, which occurred during May 1953, is 103 degrees.

In winter, temperatures can vary considerably because of the dry, cold air from the north. It is not uncommon for temperatures to fall from a daytime high in the 70's to a nighttime low in the 30's with the passing of a cold front. The coldest temperatures usually occur the second night after the front passes.

During winter, the mean daily maximum temperature is 75 degrees, and the mean daily minimum temperature is 48 degrees. The lowest recorded temperature, which occurred during January 1982, is 13 degrees. Freezing temperatures can be expected several times from mid-November to the end of March. These freezing temperatures mostly occur during late December and January. They usually occur just before

sunrise, and it is very rare that the temperature does not get above 32 degrees during the day. Frost can severely damage vegetables, new growth on citrus trees, and improved pasture grasses, especially in the lower areas of the county.

Rainfall is seasonally distributed. Nearly 60 percent of the average annual precipitation falls in June through September. Most rainfall in summer comes as thundershowers of short duration during the afternoon and early evening hours. Lightning activity can be intense in these storms. These summer storms can sometimes be heavy with 2 or 3 inches of rain falling in an hour or two. Rains that last all day are rare in summer. When such rains occur, they are usually associated with a tropical storm. Rainfall in winter and spring is generally less intense than thundershowers but may last 24 hours or more.

Nearly all of the precipitation in Highlands County falls as rain. Hail falls occasionally late in the spring and early in the summer, but the hailstones generally are small and cause little damage. Snow is very rare.

Tropical storms can occur at any time during June through November but are most common in August and September. These storms can produce high winds and very heavy rainfall. These conditions can cause considerable damage and can cause flooding in the low-lying areas.

Periods of dry weather can be expected during any season but will most likely occur in winter and spring. Dry periods in April and May are most damaging because of the higher temperatures and the effects these conditions have on crops and pasture grasses. Forest fires, as well as muck fires, are more prevalent during these times, and care should be taken when burning during dry periods.

Prevailing winds generally are southerly in spring and summer and northerly in fall and winter. Wind speed during the day generally ranges from 8 to 15 miles per hour and usually drops below 8 miles per hour at night.

History

Florida became a territory of the United States in 1821, and the two original counties were formed *(5)*. These were Escambia and St. Johns Counties. From 1824 to 1887, Alachua, Hillsborough, Manatee, and DeSoto Counties were formed. Then, in 1921, DeSoto County was divided to form Highlands, Hardee, Glades, and Charlotte Counties.

In the early days, the pioneer settlers drove small herds of cattle into this area to feed on the vast prairies and marshlands. Some of the early cattlemen were Captain William Hooker, Captain John Pearce, Skipper, Durrance, Williams, Whidden, and many others. Descendants of these early settlers still own and operate ranches in Highlands County. During the 1880's and 1890's, many of the communities that make up the largest populated areas today were established. These include Avon Park, Lake Placid, Venus, Fort Basinger, and Hicoria. Sebring, which became the county seat in the early 1920's, was started by George E. Sebring in 1911. His somewhat radical design for a city, which was laid out from a center circle, has given Sebring a flavor all its own. In 1912, the Atlantic Coast Line Railroad linked Sebring and Highlands County to the rest of the State and paved the way for the rapid development of the area in the early years.

Highlands County has developed steadily since it was formed in 1921. According to census figures, the population of Highlands County in 1921 was 2,924. The 1986 population of the county was 58,151. Agriculture mainly accounted for this increase during the first 30 to 40 years. Many ranches were started with cow-calf operations for beef production. Large areas were cleared of native range and planted to improved pasture grasses. Many citrus groves were established in the ridge section of the county after agriculturalists learned that citrus could survive on the once considered useless "sugar sand" of the ridge. Climate played a key role in this development after a devastating freeze in 1895 that virtually wiped out the citrus industry in Florida. Growers learned that citrus planted near some of the lakes in the region survived the freeze.

Although agriculture still remains the stable economic base of the county, in recent years, the influx of people from northern states and the coasts of Florida has been the biggest factor in the population increase. During the winter tourist season, the county's population is estimated to more than double. Many of these winter visitors eventually become permanent residents.

Presently, the county has three incorporated cities: Sebring, Avon Park, and Lake Placid. The estimated 1986 population of Sebring was 9,991, Avon Park, 8,065, and Lake Placid, 1,002.

Water Resources

More than 50,000 acres of open water is distributed among some 50 freshwater lakes in Highlands County. Most of the lakes are the result of sinkhole formation. The largest lake in the county is Lake Istokpoga. The eastern boundary of the county is the Kissimmee River, which flows into Lake Okeechobee. Several creeks, mainly Arbuckle, Josephine, and Fisheating Creeks,

dissect parts of the county. Most of these creeks are part of the Everglades drainage system and eventually make their way to Lake Okeechobee and south.

Many of the lakes are used as sources of irrigation water for the citrus crops. Most have been developed for urban use. Numerous lakes in the county offer recreational activities for those who enjoy boating and fishing.

The Floridan Aquifer is the primary source of all underground water in central Florida. The shallow aquifers that overlie the Floridan Aquifer, including the surficial sands and the upper region of the Hawthorn Formation, are secondary sources. Wells provide most of the water for human use in Highlands County, including most municipal water systems. The wells are generally drilled and cased to a depth of 80 to 120 feet.

Physiography and Geology

Richard A. Johnson, geologist, Florida Department of Natural Resources, Bureau of Geology, prepared this section.

Physiography

Highlands County can be divided into four physiographic areas. They are, from west to east, the Western Flatlands, the Highlands Ridge, the Istokpoga-Indian Prairie Basin, and the Eastern Flatlands *(3)*.

The Western Flatlands is made up of a very flat marine terrace plain in the south and west of the county. It has many shallow lakes, which are filled only during the rainy season. Elevations in the flatlands vary between 40 and 90 feet above sea level.

The Highlands Ridge extends from the northwest to near the Glades County line in the south, adjacent to the Western Flatlands. It is a long, narrow area characterized by hills and lakes. The hills range up to 200 feet in elevation, while the lowest elevation in the region is about 40 feet above sea level. The lakes were formed by kartic processes; that is, they formed as a result of the dissolution and collapse of underlying limestone and can be termed sinkholes.

The Istokpoga-Indian Prairie Basin is between the Highlands Ridge to the west and the Eastern Flatlands to the east. It consists of swamps and marshes south of, and including, Lake Istokpoga. Elevations in the region vary between 25 and 40 feet above sea level.

The Eastern Flatlands extends from the north-central area of the county to the southeast along the Kissimmee River, which bounds the province to the east. In general, it consists of flat, well drained land that has a few scattered ponds and marshes. Elevations vary from 30 to about 150 feet.

Geology

The geology of Highlands County is primarily known from well cuttings and cores, since most of the formations described do not exist in surface exposures in the county. The formations will be considered from the deepest to the most shallow.

The Middle Eocene Avon Park Limestone Formation consists of beds of gray to brown limestone and dolostone, which are soft to hard and granular to chalky. It consists of a foraminifera and small echinoid hash that has been differentially cemented and recrystallized. The formation ranges between 200 and 350 feet in thickness. The top of the formation is about 500 feet below sea level in the northern part of the county and dips to more than 900 feet below sea level in the southern part.

The Late Eocene Ocala Limestone Formation overlies the Avon Park Limestone and consists of a white to tan foraminiferal hash that has been very poorly cemented to very well cemented and recrystallized. The dominant rock type is limestone, but thin dolostone beds can be toward the base. Generally, the formation is very soft and crumbly. The formation ranges between 200 and 400 feet in thickness. The top of the Ocala Limestone Formation is between depths of 250 feet below sea level to the north and 650 feet below sea level to the south.

The Oligocene Suwannee Limestone Formation overlies the Ocala Limestone in the western part of the county. It consists of a cream color to a white, soft, chalky limestone to slightly crystalline limestone. It is composed of foraminifera, echinoids, and mollusca. The maximum thickness is about 80 feet, and it does not exist in the eastern half of the county. The top of the formation ranges between 200 feet below sea level in the northwestern part of the county and approximately 550 feet below sea level in the southwestern part.

Overlying the Suwannee Limestone Formation to the west and the Ocala Limestone Formation to the east is the Miocene Hawthorn Group, which consists of a green to white phosphatic clay; white to cream sandy, phosphatic limestone; and quartz sand. Generally, the group is noted for its content of phosphate, although thin beds can exist that do not contain phosphate or that contain only a very low percent of the mineral. The thickness of the Hawthorn Group ranges between 300 feet in the northern part of the county and about 650 feet in the Lake Placid area. The top of the group is probably at a depth of less than 200 feet everywhere in the county.

The Pliocene Tamiami Formation may be present in

the eastern part, and possibly the southwestern part, of Highlands County. It consists of shell marl, shelly sand, and possibly shelly limestone beds. Locally, the Tamiami Formation may be as much as 100 feet thick.

In the ridge section of the county, the Cypresshead Formation overlies the Hawthorn Group. It consists of sand, clay, and gravel that are generally red to orange. The top of this group is commonly exposed in clay pits along the ridge.

Over all of Highlands County, Pleistocene and Holocene sand and peat are at the surface. The thickness ranges between 1 and 100 feet. These undifferentiated deposits overlie the Cypresshead Formation, the Hawthorn Group, and the Tamiami Formation, depending upon their location in the county.

Farming

Highlands County soils and climate are well suited to a variety of agricultural enterprises. Citrus crops and beef-cattle operations are the main enterprises, and others in the county include small scale vegetable production, nursery operations, caladium production, and dairy operations.

Citrus crops are grown on more than 46,000 acres *(7)*. Most of the citrus is on excessively drained upland soils, such as Astatula sand, 0 to 8 percent slopes, and Paola sand, 0 to 8 percent slopes. In recent years, flatwood soils have also been converted to citrus. This requires extensive drainage, as well as irrigation. Most of the citrus grown in the county goes into the production of juice. A limited amount is sold as fresh fruit. The 1986 estimated amount of fruit produced in the county was 13,912,000 boxes of oranges and 2,395,000 boxes of grapefruit.

Cattle raising in the county is mainly cow-calf herds, totaling 97,525 head. The calves are sold and shipped to the midwest for finishing. Most of these operations are in the flatwood areas. They are mainly on improved pasture, totaling 223,000 acres. In recent years, native range, totaling 239,000 acres, has also been used in the production of cattle. Many varieties of cattle are produced in the county. These include the Hereford, Angus Brahman, Santa Gertrudis, and various crosses. Improved pasture species are bahiagrass, pangolagrass, hermarthria, and white clover. These varieties are sometimes grown as hay crops.

Small scale vegetable operations are mainly on the flatwood soils. Generally, these areas are cleared native rangeland that has been drained and bedded. A variety of crops are grown in the county, but watermelon seems to be the most popular with local growers. Other crops include tomatoes, cucumbers, squash, and strawberries.

Nursery operations have been on the increase in recent years. A variety of wholesale nursery operations in the county include citrus, oaks, palms, azaleas, and ornamentals, and several retail outlets are in the county as well.

The growing of caladium tubers is a large agricultural enterprise unique to Highlands County. This is the only county in the country where tubers are grown for resale on a large scale. It is an estimated 5 to 7 million dollar industry. Caladiums are grown on deep, organic soils, such as Brighton muck and Hontoon muck. They are planted in April or May and harvested from November through March. Most growers farm 10- to 35-acre fields and can grow over 40 different varieties. The two main varieties are Condium and Freidahemple. Caladiums are used in landscaping and for potted plants in the north.

The dairy industry is centered around 11 dairies throughout Highlands County. Most of these dairies have over 300 cows and range upward to 1,000 or more. Most of the dairies are on flatwood soils, such as Immokalee sand. Grains for the cows are provided from the midwest. Hay is grown locally.

Transportation

Several county, state, and federal highways provide ready access between population centers in the county. U.S. Highway 27, a four lane road, is the major artery and connects the major towns north to south. The two east-west arteries are U.S. 98 in the north and State Highway 70 in the south. Rail and bus service is available. Sebring Airport has limited air service, mainly, commuter type service.

How This Survey Was Made

This survey was made to provide information about the soils in the survey area. The information includes a description of the soils and their location and a discussion of the suitability, limitations, and management of the soils for specified uses. Soil scientists observed the steepness, length, and shape of slopes; the general pattern of drainage; and the kinds of crops and native plants growing on the soils. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material from which the soil formed. The

unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

The soils in the survey area occur in an orderly pattern that is related to the geology, the landforms, relief, climate, and the natural vegetation of the area. Each kind of soil is associated with a particular kind of landscape or with a segment of the landscape. By observing the soils in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept, or model, of how the soils were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

In Highlands County, a ground-penetrating radar (GPR) system and hand transects were used to document the type and variability of soils that occur within map units *(6)*. The GPR system was successfully used on selected soils to detect the presence, determine the variability, and measure the depth to major soil horizons or other soil features. Random transects were made with the GPR and by hand in Highlands County. The data collected were used to classify the soils and to determine the composition of map units. The map units, as described in the section entitled "Detailed Soil Map Units," are based on this data.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, acidity, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. The system of taxonomic classification used in the United States is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While a soil survey is in progress, samples of some of the soils in the area are generally collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties in terms of expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses under different levels of management. Some interpretations are modified to fit local conditions, and new interpretations sometimes are developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot assure that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Map Unit Composition

A map unit delineation on a soil map represents an area dominated by one major kind of soil or an area dominated by several kinds of soil. A map unit is identified and named according to the taxonomic classification of the dominant soil or soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural objects. In common with other natural objects, they have a characteristic variability in their properties. Thus, the range of some observed

properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of soils of other taxonomic classes. Consequently, every map unit is made up of the soil or soils for which it is named and some soils that belong to other taxonomic classes. In the detailed soil map units, these latter soils are called inclusions or included soils. In the general soil map units, they are called soils of minor extent.

Most inclusions have properties and behavioral patterns similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting (similar) inclusions. They may or may not be mentioned in the map unit descriptions. Other inclusions, however, have properties and behavior divergent enough to affect use or require different management. These are contrasting (dissimilar) inclusions. They generally occupy small areas and cannot be shown separately on the soil maps because of the scale used in mapping. The inclusions of contrasting soils are mentioned in the map unit descriptions. A few inclusions may not have been observed, and consequently are not mentioned in the descriptions, especially where the soil pattern was so complex that it was impractical to make enough observations to identify all of the kinds of soils on the landscape.

The presence of inclusions in a map unit in no way diminishes the usefulness or accuracy of the soil data. The objective of soil mapping is not to delineate pure taxonomic classes of soils but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but onsite investigation is needed to plan for intensive uses in small areas.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils and some minor soils. It is named for the major soils. The soils making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils can be identified on the map. Likewise, areas where the soils are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or a building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

Soils of the Upland Ridges

The two general soil map units in this group consist of nearly level to rolling, excessively drained to somewhat poorly drained soils that are sandy throughout. Most of these soils have a yellow or white subsoil, and some have an organic-stained subsoil. The soils in these map units are along U.S. Highway 27 from the Polk County line south to Venus.

1. Astatula-Paola-Tavares

Nearly level to rolling, excessively drained to moderately well drained, sandy soils

This map unit consists mostly of deep soils on high and moderately high sandy ridges in the ridge part of Highlands County. The ridge area extends from the northwest corner of the county and is parallel to U.S. Highway 27 through the central part of the county. The ridge area drops in elevation and ends near the intersection of U.S. Highway 27 and Highlands County Road 731. The ridge is 4 to 8 miles wide and has many sinkhole lakes.

The natural vegetation is sand pine, South Florida slash pine, turkey oak, sand oak, sand live oak, scattered saw palmetto, prickleypear cactus, and pineland threeawn (fig. 1).

This map unit makes up about 79,000 acres, or 12 percent, of the county. It is about 53 percent Astatula soils, 16 percent Paola soils, 15 percent Tavares soils, and 16 percent soils of minor extent.

Astatula soils are excessively drained. Typically, the surface layer of these soils is dark grayish brown sand about 7 inches thick. The underlying material to a depth of 80 inches or more is brownish yellow sand.

Paola soils are excessively drained. Typically, the surface layer of these soils is gray sand about 5 inches thick. The subsurface layer, to a depth of 17 inches, is light gray sand. The subsoil, to a depth of 27 inches, is very pale brown and yellowish brown sand. The substratum to a depth of 80 inches is yellowish brown and yellow sand.

Tavares soils are moderately well drained. Typically, the surface layer of these soils is dark grayish brown sand about 6 inches thick. The upper part of the underlying material, to a depth of about 56 inches, is yellow and very pale brown sand. The lower part to a depth of 80 inches or more is white sand.

Of minor extent in this map unit are mostly Archbold, Orsino, Satellite, and St. Lucie soils.

Much of the acreage in this map unit is in citrus crops and is used for urban development. Present trends are towards converting large areas of the sand ridge into urban and commercial uses. Some areas are used for cultivated crops and improved pasture, but these uses are limited because of droughtiness and rapid leaching of plant nutrients. The remainder of the map unit is in natural vegetation.

2. Satellite-Archbold-Pomello

Nearly level or gently sloping, somewhat poorly drained to moderately well drained, sandy soils; some have an organic-stained subsoil

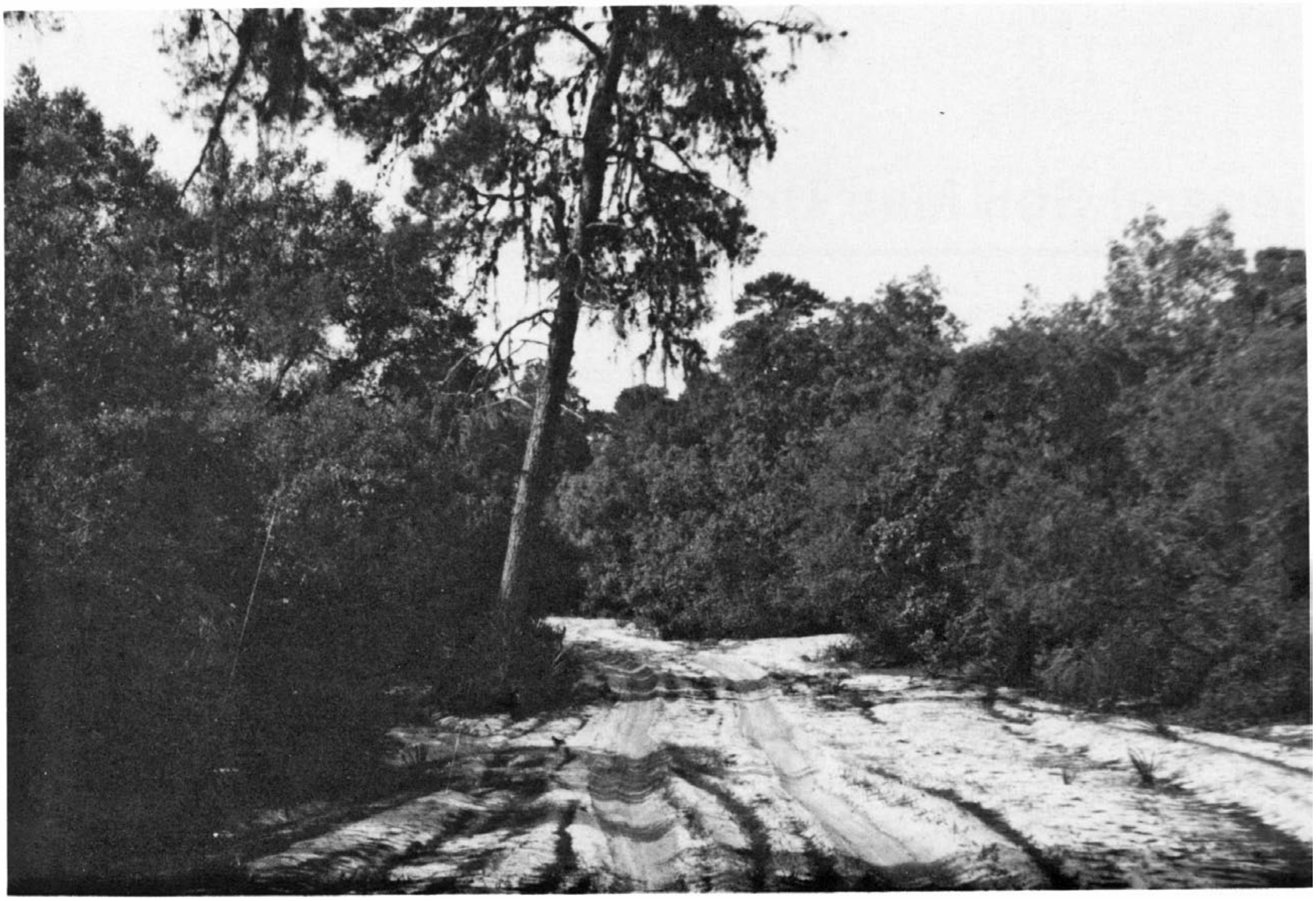


Figure 1.—The natural vegetation on this Paola sand, 0 to 8 percent slopes, is mostly sand pine and sand live oak.

This map unit consists of the deep, sandy, acid soils on the lower ridges in the ridge part of Highlands County. The soils in this map unit are in the northwestern corner of the county, parallel to U.S. Highway 27 to the southern county line. These soils generally are in a band east and west of U.S. Highway 27, averaging about 3 miles wide.

The natural vegetation consists of slash pine, myrtle oak, Chapman oak, sand live oak, sand pine, saw palmetto, pricklypear cactus, and scattered stands of pineland threeawn.

This map unit makes up about 59,000 acres, or 9 percent, of the land area of the county. It is about 45 percent Satellite soils, 20 percent Archbold soils, 15 percent Pomello soils, and 20 percent soils of minor extent.

Satellite soils are somewhat poorly drained. Typically, the surface layer of these soils is dark gray sand about 4 inches thick. The underlying material to a depth of 80 inches or more is white sand.

Archbold soils are moderately well drained. Typically, the surface layer of these soils is gray sand about 4 inches thick. The underlying material to a depth of 80 inches or more is white sand.

Pomello soils are moderately well drained. Typically, the surface layer of these soils is dark gray sand about 4 inches thick. The subsurface layer, to a depth of 56 inches, is white sand. The upper part of the subsoil, to a depth of 62 inches, is mixed dark brown and dark reddish brown sand. The lower part to a depth of 80 inches is brown sand.

Of minor extent in this map unit are mostly Daytona, Duette, Orsino, and St. Lucie soils.

Most of this map unit is in native vegetation, but

some areas have been cleared for citrus and pasture production. Other areas are used as building sites and as a source of sand for concrete.

Soils of the Flatwoods and Sloughs

The four general soil map units in this group consist of nearly level, poorly drained or very poorly drained soils on the flatwoods and in sloughs. Map unit 3 is the largest of the general soil map units in the county. The soils in this map unit have an organic-stained layer at a depth of less than 50 inches. Map units 4 and 5 are in sloughs and depressions, and these soils are sandy throughout or have a loamy subsoil. The soils in map unit 6 have an organic-stained subsoil and a loamy subsoil.

3. Myakka-Immokalee-Smyrna

Nearly level, poorly drained, sandy soils that have an organic-stained subsoil

This map unit consists of soils on the flatwoods that are interspersed with wet depressions. It is the largest of the general soil map units. These soils are dominantly in the eastern part of Highlands County, but they are in all parts of the county except in the ridge part.

The natural vegetation is slash pine, saw palmetto, gallberry, pineland threeawn, and chalky and creeping bluestems.

This map unit makes up about 217,000 acres, or 33 percent, of the county. It is 35 percent Myakka soils, 35 percent Immokalee soils, 10 percent Smyrna soils, and 20 percent soils of minor extent.

Typically, Myakka soils have a surface layer of black fine sand about 4 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and light brownish gray sand. The upper part of the subsoil, to a depth of about 58 inches, is black and dark brown sand. The lower part to a depth of 80 inches is dark brown or brown sand.

Typically, Immokalee soils have a surface layer of black sand about 6 inches thick. The subsurface layer, to a depth of 37 inches, is gray and white sand. The subsoil to a depth of 80 inches is black sand.

Typically, Smyrna soils have a surface layer of dark gray sand about 5 inches thick. The subsurface layer, to a depth of 15 inches, is light gray fine sand. The subsoil, to a depth of 35 inches, is black, dark brown, and brown fine sand. The upper part of the substratum, to a depth of 45 inches, is light yellowish brown fine sand. The middle part, to a depth of 56 inches, is light gray fine sand. The lower part to a depth of 80 inches is white fine sand.

Of minor extent in this map unit are mostly Basinger, Felda, Hicoria, and Placid soils.

Large acreages of the soils in this map unit have been cleared for pasture and citrus crops. The remainder is in native range.

4. Felda-Hicoria-Malabar

Nearly level, poorly drained or very poorly drained, sandy soils that are underlain by loamy material at a depth of 20 to more than 40 inches

This map unit consists of soils in low, broad, flat areas and sloughs that are interspersed with many small to large wet depressions. These soil are mostly along the Glades County line and Florida State Highway 70 in the east central part of Highlands County. Smaller areas of these soils are scattered throughout the county.

The natural vegetation in the sloughs and broad, flat areas is slash pine, cabbage palm, saw palmetto, waxmyrtle, fetterbush, maidencane, pineland threeawn, sand cordgrass, and various bluestems and sedges. The vegetation in the depressional areas is cypress, willow, bay, tupelo-gum, and blackgum trees and pickerelweed, arrowhead, waxmyrtle, sawgrass, maidencane, and other water-tolerant plants.

This map unit makes up about 53,000 acres, or 8 percent, of the land area of the county. It is about 50 percent Felda soils, 13 percent Hicoria soils, 12 percent Malabar soils, and 25 percent soils of minor extent.

Felda soils are poorly drained. Typically, the surface layer of these soils is gray fine sand about 7 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and dark grayish brown fine sand. The subsoil, to a depth of 36 inches, is gray very fine sandy loam. The upper part of the substratum, to a depth of 68 inches, is light gray fine sand. The lower part to a depth of 80 inches is dark grayish brown fine sand.

Hicoria soils are very poorly drained. Typically, the upper part of the surface layer of these soils is black mucky sand about 4 inches thick, and below that layer, to a depth of 15 inches, is black sand. The subsurface layer, to a depth of 21 inches, is light gray sand. The upper part of the subsoil, to a depth of 39 inches, is dark gray fine sandy loam. The middle part, to a depth of 52 inches, is grayish brown fine sandy loam. The lower part to a depth of 80 inches is dark gray fine sandy loam.

Malabar soils are poorly drained. Typically, the

surface layer of these soils is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 14 inches, is light gray fine sand. The upper part of the subsoil, to a depth of 48 inches, is yellow, yellowish brown, and light yellowish brown fine sand. The lower part to a depth of 80 inches is greenish gray fine sandy loam.

Of minor extent in this map unit are mostly Basinger, Chobee, Pineda, Tequesta, and Valkaria soils.

Most areas have been cleared and are used for pasture. A few areas have been planted to citrus crops.

5. Basinger-Valkaria-Placid

Nearly level, poorly drained or very poorly drained, sandy soils

This map unit consists of narrow to broad sloughs, low flatwoods, and poorly defined drainageways that are interspersed with wet depressional areas. These areas are randomly scattered throughout the flatwoods part of Highlands County and vary in size and shape.

The natural vegetation on the poorly drained soils is slash pine, gallberry, pineland threeawn, cutthroat grass, maidencane, St. Johnswort, sand cordgrass, and various bluestems. The vegetation in the depressional areas is cypress, willow, and bay trees and pickerelweed, arrowhead, redroot, sawgrass, and St. Johnswort.

This map unit makes up about 112,000 acres, or 17 percent, of the land area of the county. It is about 50 percent Basinger soils, 20 percent Valkaria soils, 10 percent Placid soils, and 20 percent soils of minor extent.

Basinger soils are poorly drained. The surface layer of these soils is dark gray fine sand 6 inches thick. The subsurface layer, to a depth of 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The substratum to a depth of 80 inches is light brownish gray and grayish brown fine sand and loamy fine sand.

Valkaria soils are poorly drained. The surface layer of these soils is gray fine sand about 5 inches thick. The subsurface layer, to a depth of 16 inches, is light gray fine sand. The subsoil, to a depth of 51 inches, is yellowish brown and light yellowish brown fine sand. The substratum to a depth of 80 inches is light gray fine sand.

Placid soils are very poorly drained. The upper part of the surface layer of these soils is black fine sand about 3 inches thick. The lower part, to a depth of 11 inches, is very dark gray fine sand. The underlying material to a depth of 80 inches is in layers of light brownish gray and dark grayish brown fine sand.

Of minor extent in this map unit are mostly Felda, Immokalee, Malabar, Myakka, Sanibel, and Satellite soils.

Most areas of this map unit remain in natural vegetation and are used as habitat for wildlife and as rangeland. Some areas have been cleared and are used for pasture.

6. Oldsmar-EauGallie-Pomona

Nearly level, poorly drained, sandy soils that have an organic-stained subsoil underlain by loamy material

This map unit consists mostly of soils in flatwood areas that are adjacent to sloughs and drainageways. The soils in this map unit are near Fisheating Creek and near other major drainageways in the county. Also, these soils are along the Hardee County line. This map unit is the smallest of the general soil map units in Highlands County.

The natural vegetation is slash pine, saw palmetto, gallberry, fetterbush, running oak, waxmyrtle, pineland threeawn, creeping bluestem, chalky bluestem, maidencane, and other forbs and grasses.

This map unit makes up about 13,000 acres, or 2 percent, of the county. It is about 35 percent Oldsmar soils, 25 percent EauGallie soils, 10 percent Pomona soils, and 30 percent soils of minor extent.

Typically, Oldsmar soils have a surface layer of very dark gray sand about 4 inches thick. The subsurface layer, to a depth of 32 inches, is gray and light gray sand. The upper part of the subsoil, to a depth of 54 inches, is black, dark brown, and brown fine sand. The lower part, to a depth of 60 inches, is grayish brown sandy clay loam. The substratum to a depth of 80 inches is yellowish brown fine sand.

Typically, EauGallie soils have a surface layer of very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 26 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 40 inches, is black and dark reddish brown fine sand. The lower part of the subsoil to a depth of 80 inches is light brownish gray sandy clay loam and fine sandy loam.

Typically, Pomona soils have a surface layer of black sand about 6 inches thick. The subsurface layer, to a depth of 29 inches, is gray and light gray sand. The upper part of the subsoil, to a depth of 51 inches, is dark brown and very dark grayish brown sand coated with organic matter. Below that layer, to a depth of 61 inches, is light brownish gray sand. The lower part of

Figure 2.—This hardwood swamp consists mostly of redbay and sweetbay trees. The soil is Gator muck.

the subsoil to a depth of 80 inches or more is gray sandy loam.

Of minor extent in this map unit are mostly Felda, Immokalee, Malabar, Myakka, and Smyrna soils.

Much of the acreage in this map unit is in native range or improved pasture. Some soils in this map unit have been drained and converted to use for citrus crops. The rest of this map unit is in native range.

Soils of the Swamps and Marshes

The two general soil map units in this group consist of nearly level, very poorly drained soils. Most of the soils in these map units are organic. These soils are mainly in large hardwood swamps (fig. 2) or grassy marshes, and some of these soils are in open depressions on the flatwoods. The largest area of these general soil map units is south of Lake Istokpoga. Several other large areas of these soils are scattered throughout the county.

7. Kaliga-Tequesta-Gator

Nearly level, very poorly drained soils that have an organic layer underlain by loamy material

This map unit consists mostly of soils in large marshes, swamps, and depressional areas in Highlands County. A large area of soils in this map unit is on the

southeast side of Lake Istokpoga and C41-A canal, south across Florida State Highway 70, to near the Glades County line. These soils also are along the Kissimmee River basin and in other isolated depressional areas throughout the county.

The natural vegetation is sweetbay and redbay trees and pickerelweed, arrowhead, sawgrass, waxmyrtle, maidencane, St. Johnswort, and other water-tolerant grasses and grasslike plants.

This map unit makes up about 53,000 acres, or 8 percent, of the county. It is about 30 percent Kaliga soils, 25 percent Tequesta soils, 15 percent Gator soils, and 30 percent soils of minor extent.

Typically, the upper part of the surface layer of Kaliga soils is black muck about 6 inches thick. The lower part, to a depth of 39 inches, is dark brown muck. The upper part of the underlying material, to a depth of 45 inches, is grayish brown very fine sand. Below that layer, to a depth of 68 inches, is dark gray very fine sandy loam. The lower part to a depth of 80 inches is grayish brown very fine sand.

Typically, Tequesta soils have an organic surface layer of black muck about 12 inches thick. Below that layer, to a depth of 17 inches, is black fine sand. The subsurface layer, to a depth of 32 inches, is light brownish gray fine sand. The subsoil, to a depth of 77 inches, is dark gray fine sandy loam. The substratum to a depth of 80 inches or more is light gray fine sand.

Typically, Gator soils have an organic surface layer of black muck about 18 inches thick. The upper part of the underlying material, to a depth of 36 inches, is very dark gray sandy clay loam. The middle part, to a depth of 55 inches, is stratified, dark grayish brown sandy loam and loamy sand. The lower part to a depth of 80 inches or more is a mixture of dark gray and gray sand.

Of minor extent in this map unit are mostly Brighton, Chobee, Hicoria, Hontoon, and Sanibel soils.

Much of the acreage in this map unit has been cleared and drained for improved pasture. With extensive drainage and bedding, some areas of this map unit are being used for citrus crops. A small percentage of the areas is in caladiums and vegetable production. The remainder of the map unit has been left in natural vegetation.

8. Samsula-Hontoon-Sanibel

Nearly level, very poorly drained soils; most are organic and have a sandy substratum; some have a thin, organic surface layer

This map unit consists of broad marshes that are adjacent to Lake Istokpoga and to Morgan Hole and Arbuckle Creeks on the Avon Park Bombing Range. The soils in this map unit are also near drainageways that drain into small lakes around Highlands County.

The natural vegetation consists of sweetbay, blackgum, red maple, and cypress trees and St. Johnswort, sawgrass, waxmyrtle, arrowhead, pickerelweed, and maidencane.

This map unit makes up about 46,000 acres, or about 7 percent, of the county. It is about 35 percent Samsula soils, 20 percent Hontoon soils, 15 percent Sanibel soils, and 30 percent soils of minor extent.

Typically, Samsula soils have an organic surface layer of black muck about 36 inches thick. The upper part of the underlying material, to a depth of 45 inches, is black sand. The lower part to a depth of 65 inches or more is dark gray, grayish brown, and gray sand.

Typically, Hontoon soils have an organic surface layer that is dark reddish brown muck 15 inches thick, and below that layer, to a depth of 65 inches, is black muck. The underlying material, to a depth of 73 inches, is black mucky sand, and below that layer to a depth of more than 80 inches is dark gray sand.

Typically, Sanibel soils have a surface layer of black muck about 8 inches thick, and below that layer, to a depth of 15 inches, is black mucky fine sand. The underlying material to a depth of 80 inches or more is sand in shades of gray.

Of minor extent in this map unit are mostly Brighton, Chobee, Gator, Hicoria, and Tequesta soils.

Much of the acreage in this map unit is in natural vegetation. Small areas have been drained for caladium production, truck farming, and improved pasture.

Soils of the Cutthroat Seeps

The one general soil map unit in this group is in a distinct landform in Highlands County that is commonly referred to as a cutthroat seep. The soils in this map unit are on slopes that seep. These sandy soils are poorly drained and very poorly drained. The group name of this map unit is from the dominant vegetation, which is cutthroat grass.

9. Basinger-St. Johns-Placid

Nearly level, poorly drained or very poorly drained, sandy soils; some have an organic-stained subsoil

This map unit consists of nearly level soils that are adjacent to the central ridge in Highlands County. A

small part of this map unit is on the Avon Park Bombing Range that is adjacent to a small isolated ridge east of Morgan Hole Creek.

The natural vegetation in the cutthroat seep is mostly made up of cutthroat grass, pineland threeawn, and slash pine. Other vegetation in the seep is St. Johnswort, waxmyrtle, creeping bluestem, fetterbush, gallberry, saw palmetto, and maidencane and bay trees.

This map unit makes up about 26,000 acres, or about 4 percent, of the county. It is about 40 percent Basinger soils, 20 percent St. Johns soils, 15 percent Placid soils, and 25 percent soils of minor extent.

Basinger soils are poorly drained. Typically, the surface layer of these soils is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is mostly light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine sand.

St. Johns soils are poorly drained. Typically, the surface layer of these soils is black sand about 11 inches thick. The subsurface layer, to a depth of 26 inches, is light brownish gray sand. The subsoil is sand throughout. The upper part of the subsoil, to a depth of 31 inches, is very dark brown. Below that layer, to a depth of 49 inches, the subsoil is black. The next layer, to a depth of 70 inches, is dark yellowish brown. The lower part of the subsoil to a depth of 80 inches or more is very dark gray.

Placid soils are very poorly drained. Typically, the surface layer of these soils is black fine sand about 3 inches thick. Below that layer, to a depth of 11 inches, is very dark gray fine sand. The underlying material to a depth of 80 inches is light brownish gray and dark grayish brown fine sand.

Of minor extent in this map unit are mostly EauGallie, Felda, Immokalee, Myakka, Sanibel, Satellite, Smyrna, and Valkaria soils.

Most areas of this map unit have been left in natural vegetation and are used as habitat for wildlife and as rangeland. Some areas have been cleared and are used for pasture.

Detailed Soil Map Units

The map units on the detailed soil maps at the back of this survey represent the soils in the survey area. The map unit descriptions in this section, along with the soil maps, can be used to determine the suitability and potential of a soil for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit, or soil, is given under "Use and Management of the Soils."

Each map unit on the detailed soil maps represents an area on the landscape and consists of one or more soils for which the unit is named.

A symbol identifying the soil precedes the map unit name in the soil descriptions. Each description includes general facts about the soil and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series.* Except for differences in texture of the surface layer or of the underlying material, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying material. They also can differ in slope, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases.* Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Basinger fine sand, depressional, is one of several phases in the Basinger series.

Some map units are made up of two or more major soils. These map units are called soil complexes or undifferentiated groups.

A *soil complex* consists of two or more soils in such an intricate pattern or in such small areas that they cannot be shown separately on the soil maps. The pattern and proportion of the soils are somewhat similar in all areas. Anclote-Basinger fine sands, frequently flooded, is an example.

An *undifferentiated group* is made up of two or more soils that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils in a mapped area are not uniform. An area can be made up of only one of the major soils, or it can be made up of all of them. Basinger, St. Johns, and Placid soils are an undifferentiated group in this survey area.

Most map units include small scattered areas of soils other than those for which the map unit is named. Some of these included soils have properties that differ substantially from those of the major soil or soils. Such differences could significantly affect use and management of the soils in the map unit. The included soils are identified in each map unit description. Some small areas of strongly contrasting soils are identified by a special symbol on the soil maps.

Table 2 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils.

1—Paola sand, 0 to 8 percent slopes. This nearly level to moderately sloping, excessively drained soil is on high sandy ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 25 to more than 500 acres. The slopes are smooth to convex.

Typically, the surface layer is gray sand about 5 inches thick. The subsurface layer, to a depth of 17 inches, is light gray sand. The subsoil, to a depth of 27 inches, is very pale brown and yellowish brown sand. The substratum to a depth of 80 inches or more is yellowish brown and yellow sand.

Included with this soil in mapping are small areas of Astatula, Orsino, Pomello, St. Lucie, and Tavares soils. In most areas, the included soils make up 10 to 25 percent of the map unit.

The available water capacity of this Paola soil is very low. The permeability is very rapid. Depth to the water

table is more than 80 inches.

Most of the acreage of this soil is in citrus or natural vegetation. Some areas have been cleared for improved pasture and cultivated crops. The natural vegetation consists of sand pine, slash pine, turkey oak, scrub hickory, myrtle oak, Chapman oak, and sand live oak. The understory consists of scattered saw palmetto and pineland threeawn.

This Paola soil has very severe limitations for cultivated crops. Intensive management, including irrigation, is required if this soil cultivated.

Citrus trees are well suited to this soil under a high level of management. Good yields of oranges and grapefruit can be obtained with adequate irrigation. A properly designed irrigation system is needed to ensure consistent high yields.

The potential of this soil for production of pasture and hay crops is low. Bahiagrass and pangolagrass are best adapted to this soil. Regular applications of fertilizer and lime are needed. Grazing should be controlled to permit plants to recover from grazing and to maintain vigor.

The potential of this soil for production of pine trees is low. Equipment use limitations and seedling mortality are the main management problems. Sand pine is the preferred tree for planting.

The potential of this soil for the production of desirable range plants is very low. The plant community consists of a woody understory, which is seldom grazed by livestock. This soil is in the Sand Pine Scrub range site.

This soil has slight limitations for most urban uses, such as dwellings and local roads and streets. For lawns and recreational development, this soil has severe limitations because of droughtiness and sandy texture. Most of these limitations can be overcome by adding suitable topsoil and by watering as needed.

This Paola soil is in capability subclass VIs.

2—St. Lucie sand, 0 to 8 percent slopes. This nearly level to moderately sloping, excessively drained soil is on high ridges and knolls in the ridge part of the county. The mapped areas are irregular in shape and range from 5 to more than 50 acres. The slopes are smooth to convex.

Typically, the surface layer is gray sand about 4 inches thick. The underlying material to a depth of 80 inches or more is white sand.

Included with this soil in mapping are small areas of Archbold, Astatula, Duette, Orsino, and Paola soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this St. Lucie soil is very low. The permeability is very rapid. Depth to the water table is more than 80 inches.

Most of the acreage of this soil is in natural vegetation. Some areas have been cleared for citrus crops. The natural vegetation consists of rosemary, sand pine, Chapman oak, myrtle oak, and a few scrub hickory. The understory consists of scattered saw palmetto and pricklypear cactus.

This St. Lucie soil has very severe limitations for cultivated crops. Intensive management, including irrigation, is required if this soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce potential yields of adapted crops.

Citrus trees are moderately suited to this soil. A properly designed irrigation system is needed to ensure optimum yields and survival of the trees.

Pasture and hay crops are not suited to this soil. Droughtiness and the available water capacity are the limiting factors.

The potential of this soil for production of pine trees is low. Equipment use limitations and seedling mortality are the main management problems. Sand pine is the preferred tree for planting.

The potential of this soil for the production of desirable range plants is very low. The plant community consists of dense woody plants, which are not used by livestock. No appreciable forage is on this soil. This soil is in the Sand Pine Scrub range site.

This soil has slight limitations for most urban uses. If the soil is used for lawns and gardens, it must be irrigated. It has severe limitations for recreational development because the surface layer is too sandy. This limitation can be overcome by stabilizing the surface layer or by adding suitable topsoil.

This St. Lucie soil is in capability subclass VIIs.

3—Basinger fine sand, depressional. This very poorly drained, sandy soil is in wet depressions. The mapped areas are irregular in shape and range from 5 to more than 50 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 6 inches thick. The subsurface layers, in sequence, are light brownish gray sand to a depth of 16 inches, light gray sand to a depth of 32 inches, and dark grayish brown sand to a depth of 48 inches. The underlying material to a depth of 80 inches or more is dark grayish brown sand and grayish brown sand.

Included in mapping are small areas of Immokalee, Myakka, Placid, and Valkaria soils. In most areas, the included soils make up 10 to 30 percent of the map unit.

The available water capacity of this Basinger soil is low. The permeability is rapid. Internal drainage is very slow because of the high water table. This soil is ponded for 4 to 6 months each year.

Most of the acreage of this soil is in natural vegetation. The natural vegetation consists of pickerelweed, maidencane, cutgrass, sand cordgrass, St. Johnswort, and chalky bluestem. A few areas are in water-tolerant trees.

This Basinger soil has very severe limitations for cultivated crops because of ponding. It is not suited to cultivated crops without an intensive water control system to remove excess surface water rapidly after heavy rains and to provide for rapid internal drainage from the soil above the high water table. Most places do not have suitable drainage outlets.

Citrus trees are not suited to this soil unless a water control system is established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, if adequate measures are taken to remove excess surface water and intensive management practices used, the potential of this soil for production of improved pasture grasses is moderate. Pangolagrass, bahiagrass, and white clover are well adapted to this soil. Grazing should be controlled to maintain plant vigor, and regular applications of lime and fertilizer are needed.

Under natural conditions, this soil is not suited to slash or longleaf pines because of excessive wetness and ponding.

The potential of this soil for the production of range plants is high. The dominant forage is maidencane and cutgrass. The water level fluctuates throughout the year, deferring cattle from grazing. This rest period increases forage production; however, these periods of high water may reduce the grazing value of the site. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for building sites, sanitary facilities, and recreational development mostly because of wetness and ponding. Extensive measures should be taken before using this soil for urban development.

This Basinger, depressional soil is in capability subclass VIIw.

4—Duette sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is in moderately high sandy areas in the ridge part of the county. It also is on elevated knolls or ridges in the flatwood areas. The mapped areas are irregular in shape and mostly range from 10 to 125 acres. The slopes are generally smooth to convex.

Typically, the surface layer is dark gray sand about 6 inches thick. The subsurface layer, to a depth of 51 inches, is light gray and white sand. The upper part of the subsoil, to a depth of 59 inches, is dark reddish brown sand. The lower part to a depth of 80 inches is mixed yellowish brown and very pale brown sand.

Included with this soil in mapping are small areas of Archbold, Orsino, Paola, Pomello, and Satellite soils. In most areas, the included soils make up 10 to 30 percent of the map unit.

The available water capacity of this Duette soil is very low. The permeability is moderately rapid. The water table is at a depth of 48 to 72 inches for 1 to 4 months during the summer rainy season. It recedes to a lower depth during the rest of the year.

Most of the acreage of this soil remains in native vegetation or is in citrus crops. A few areas have been cleared for cultivated crops and improved pasture. The natural vegetation consists of sand and slash pines and sand live oak, Chapman oak, and myrtle oak. The understory consists of scattered saw palmetto and pineland threeawn.

This Duette soil has very severe limitations for cultivated crops. Intensive management is required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety and potential yields of adapted crops. Irrigation is advisable if adequate water is readily available.

Citrus trees are moderately well suited to this soil. A properly designed irrigation system is needed to ensure consistent high yields of oranges and grapefruit.

The potential of this soil for production of improved pasture grasses and hay crops is moderate. Bahiagrass and bermudagrass are best adapted to this soil. Regular applications of lime and fertilizer are needed. Grazing should be controlled to maintain plant vigor and to permit grasses to recover from grazing.

The potential of this soil for production of pine trees is low. Equipment use limitations and seedling mortality are the main management problems. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

Range plant production is very low on this soil. The plant community consists of a dense woody understory, which is seldom grazed by livestock. The dominate forage is pineland threeawn. This soil is in the Sand Pine Scrub range site.

This soil has slight limitations for local roads and streets, small commercial buildings, and dwellings

without basements. For other urban uses, it has moderate limitations because the seasonal high water table is at a depth of 4 to 6 feet. This soil has severe limitations for recreational development because it is too sandy, causing poor trafficability. This limitation can be reduced or overcome by adding suitable topsoil or by stabilizing the surface layer.

This Duette soil is in capability subclass VIs.

5—Daytona sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on elevated ridges on the flatwoods and on moderately high ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to more than 75 acres. The slopes are generally smooth to convex.

Typically, the surface layer is very dark gray sand about 3 inches thick. The subsurface layer, to a depth of 36 inches, is white sand. The upper part of the subsoil, to a depth of 45 inches, is black sand. The lower part, to a depth of 59 inches, is mixed black sand gradually changing to brown sand. The substratum to a depth of 80 inches or more is light gray sand.

Included with this soil in mapping are small areas of Archbold, Duette, Immokalee, Pomello, and Satellite soils. In most areas, the included soils make up 15 to 30 percent of the map unit.

The available water capacity of this Daytona soil is very low. The permeability is moderately rapid. The water table is at a depth of 40 to 60 inches during the summer rainy season. It recedes to a lower depth during the rest of the year.

Most of the acreage of this soil is in natural vegetation. Some areas have been cleared for citrus crops and improved pasture. The natural vegetation consists of slash pine, sand pine, sand live oak, Chapman oak, and myrtle oak. The understory consists mostly of saw palmetto and pineland threeawn.

This Daytona soil has very severe limitations for cultivated crops. Droughtiness and rapid leaching of plant nutrients reduce the variety and potential yields of adapted crops. Irrigation is advisable.

Citrus trees are moderately well suited to this soil. A properly designed irrigation system is needed to ensure high yields.

The potential of this soil for production of improved pasture grasses and hay crops is moderate. Bahiagrass and bermudagrass are best adapted to this soil. Fertilizer and lime are needed. Grazing should be controlled to maintain plant vigor.

The potential of this soil for production of pine trees is low. Equipment use and seedling mortality are the main concerns in management. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for the production of range plants is very low. The plant community consists of a dense woody understory, which is seldom grazed by cattle. The dominate forage is pineland threeawn. This soil is in the Sand Pine Scrub range site.

This soil has slight limitations for dwellings without basements, small commercial buildings, and local roads and streets. Lawns have to be watered regularly. This soil has moderate limitations if used as septic tank absorption fields because the water table is between depths of 40 and 60 inches for part of the year. For recreational development, this soil has severe limitations because it is sandy, causing poor trafficability. This limitation can be overcome by adding suitable topsoil or by stabilizing the surface layer.

This Daytona soil is in capability subclass VIs.

6—Tavares sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on moderately high sandy ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to about 50 acres. The slopes are smooth to convex.

Typically, the surface layer is dark grayish brown sand about 6 inches thick. The upper part of the underlying material, to a depth of about 56 inches, is yellow and very pale brown sand. The lower part to a depth of 80 inches or more is white sand.

Included with this soil in mapping are small areas of Archbold, Astatula, Orsino, Paola, St. Lucie, and Satellite soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Tavares soil is very low. The permeability is rapid or very rapid. The water table is at a depth of 48 to 72 inches for 1 to 4 months during the summer rainy season. During dry periods, the water table may recede below these depths.

Most of the acreage of this soil is in citrus crops or has been left in natural vegetation. The natural vegetation consists of sand pine, slash pine, longleaf pine, south Florida slash pine, turkey oak, and sand live oak. The understory consists of scattered saw palmetto, pineland threeawn, and various other forbs.

This Tavares soil has very severe limitations for cultivated crops. Intensive management is required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety and potential yields of

adapted crops. Irrigation is advisable if adequate water is readily available.

Citrus trees are well suited to this soil. Good yields of oranges and grapefruit can be obtained in some years without irrigation. A properly designed irrigation system is needed to ensure consistent high yields.

The potential of this soil for production of pasture grasses and hay crops is moderate. Bahiagrass and bermudagrass are well adapted to this soil. Grazing should be controlled to permit plants to recover from grazing and to maintain plant vigor.

The potential of this soil for production of pine trees is moderate. Equipment use limitations and seedling mortality are the main management problems. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for production of range plants is low. The plant community consists of a dense woody understory, which is seldom grazed by livestock. The dominant forage is pineland threeawn. This soil is in the Longleaf Pine-Turkey Oak Hills range site.

This soil has moderate limitations for most urban uses because the seasonal high water table is within 4 to 6 feet of the surface. It has slight limitations for dwellings without basements, small commercial buildings, and local streets and roads.

This Tavares soil is in capability subclass IIIs.

7—Placid fine sand, depressional. This nearly level, very poorly drained soil is in depressional areas on the flatwoods and along the edges of swamps and marshes in the county. The depressional areas are circular, and the areas along the edges of swamps and marshes are irregular in shape. These mapped areas range from less than 1 acre to about 70 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the upper part of the surface layer is black fine sand about 3 inches thick. The lower part, to a depth of 11 inches, is very dark gray sand. The substratum to a depth of 80 inches is fine sand. It is in layers of light brownish gray and dark grayish brown.

Included with this soil in mapping are small areas of Basinger, Felda, Samsula, and Sanibel soils. In some areas are soils that are similar to Placid soils except they have 2 to 6 inches of muck on the surface. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Placid soil is low. The permeability is rapid. This soil is ponded for much of the year. The water table is generally within 10 inches of the surface for the rest of the year, but during long dry periods, it may recede to a depth of more than 30 inches.

Most of the acreage of this soil is in natural vegetation of bays and other water-tolerant trees and sawgrass, pickerelweed, arrowhead, redroot, St. Johnswort, cutthroat grass, and maidencane.

Under natural conditions, this Placid soil has very severe limitations for cultivated crops. Not only is wetness, which is caused by ponding, a very severe problem, but drainage and water control are also severe problems. Adequate water control systems are difficult to establish in most areas because suitable drainage outlets are not available. If a water control system can be established and maintained, most locally adapted vegetable crops can be successfully grown.

This soil is not suited to citrus trees unless a proper water control system is established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, improved pasture can be established if excess surface water is removed. A good drainage system is needed for best results. Lime and fertilizer should be added according to the need of the plants. White clover, bahiagrass, and pangolagrass are best adapted to this soil.

Under natural conditions, this soil is not suited to slash or longleaf pines because of excessive wetness and ponding.

The potential of this soil for the production of range plants is high. This soil has the potential for producing significant amounts of maidencane and cutgrass. Although many areas of this soil produce very small amounts of desirable range plants, some do and are highly valuable assets to a good range management program. These more productive areas are not grazed during wet periods, and grazing is deferred until the winter when other range plants are of reduced value and quantity. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for all urban uses because of ponding. Good drainage systems that would adequately remove the water and effectively regulate the water table are expensive and difficult to establish and maintain. Most areas do not have suitable water outlets. Even where drainage systems can be installed, the problem of keeping the areas adequately drained is a continuing hazard.

This Placid soil is in capability subclass VIIw.

8—Immokalee sand. This nearly level, poorly drained soil is on broad flatwoods and in lower areas in

the ridge part of the county. The mapped areas are irregular in shape and range from 15 to more than 500 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is black sand about 6 inches thick. The subsurface layer, to a depth of 37 inches, is gray and white sand. The subsoil to a depth of 80 inches is black sand.

Included with this soil in mapping are small areas of Basinger, Felda, Myakka, Pomello, Satellite, and Smyrna soils. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Immokalee soil is low. The permeability is moderate. The water table is within 12 inches of the surface during the summer rainy season. Generally, it is between depths of 12 and 40 inches for the rest of the year. The water table may recede to a depth of more than 40 inches during extended dry periods. Also, this soil can have a perched water table over the subsoil for short periods after heavy rainfall.

Most of the acreage of this soil is in improved pasture and native rangeland. Some areas have been cleared for citrus crops. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, running oak, saw palmetto, gallberry, fetterbush, pineland threeawn, chalky bluestem, low panicum, and various other native grasses.

This Immokalee soil has severe limitations for cultivated crops. If wetness can be overcome by providing proper drainage, a variety of vegetable crops can be grown. A water control system is needed to remove excess water and to provide irrigation during dry periods. Fertilizer and lime should be added according to the specific need of the crops.

Citrus trees are moderately well suited to this soil if a properly designed water control system is established and maintained to regulate the water table. Citrus trees should be planted in bedded rows to maintain root systems well above the seasonal high water table. Plant cover should be maintained between the rows to prevent erosion of the beds. Proper management should also include regular applications of lime and fertilizer.

The potential of this soil for production of pasture and hay crops is moderate. Water control systems are needed to remove excess water after heavy rainfall. Pangolagrass, improved bahiagrass, and white clover are best adapted to this soil.

The potential of this soil for production of pine trees is moderate. The main concerns in management are equipment use limitations and seedling mortality because of the high water table. Trees should be planted in bedded rows for highest productivity. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of desirable range plants is moderate. This soil has the potential for producing significant amounts of creeping bluestem, chalky bluestem, indiangrass, and other desirable range plants. As the range deteriorates, pineland threeawn and saw palmetto dominate the site. Management of the native rangeland should include crossfencing, cattle rotation to help maintain plant vigor, and careful consideration of the number of cattle per acre based on range condition and size of the site. This soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of wetness. Septic tank absorption fields should be mounded to maintain the system well above the seasonal high water table. Building sites for dwellings without basements should also be mounded to prevent moisture problems because of wetness. For recreational uses, this soil also has severe limitations because of wetness, but with proper drainage to remove excess surface water during wet periods, many of these limitations can be overcome.

This Immokalee soil is in capability subclass IVw.

9—Astatula sand, 0 to 8 percent slopes. This nearly level to moderately sloping, excessively drained soil is in the ridge part of the county. This soil is the dominant soil on the ridge. The mapped areas are irregular in shape and range from 50 to more than 2,500 acres. The slopes are smooth to convex.

Typically, the surface layer is dark grayish brown sand about 7 inches thick. The underlying material to a depth of 80 inches is brownish yellow sand.

Included with this soil in mapping are small areas of Orsino, Paola, St. Lucie, and Tavares soils. In some areas is a soil that is very similar to Astatula soil, but it has thin loamy sand bands or lamellae generally at a depth of more than 70 inches. In most areas, the included soils make up 10 to 30 percent of the map unit.

The available water capacity of this Astatula soil is very low. The permeability is very rapid. Depth to the water table is more than 80 inches.

Most of the acreage of this soil is in citrus crops. A large part of the acreage has been developed for urban use. Small areas have been cleared for improved pasture grasses and cultivated crops. The natural vegetation consists of sand pine, longleaf pine, turkey oak, live oak, and hickory. The understory is scattered

saw palmetto, sabal palmetto, bluestem, paspalum, cactus, and pineland threeawn.

This Astatula soil has very severe limitations for most cultivated crops. Intensive management is required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety and potential yields of adapted crops. An irrigation system is needed during dry periods.

Citrus trees are well suited to this soil. Where a high level of management and a properly designed irrigation system are used, groves can produce yields of 500 boxes per acre.

The potential of this soil for production of improved pasture grasses is moderate; however, grazing should be controlled to permit plants to recover and to maintain vigor. Bahiagrass and pangolagrass are best adapted to this soil.

The potential of this soil for production of pine trees is moderate. Equipment use limitations and seedling mortality are the main management problems. Sand pine is the preferred tree for planting.

The potential of this soil for production of desirable range plants is low. The plant community consists of a dense woody understory, which is seldom grazed by livestock. Under excellent conditions, the forage consists of creeping bluestem, indiangrass, and various other bluestems. As the range deteriorates, low panicum and pineland threeawn dominate. This soil is in the Longleaf Pine-Turkey Oak Hills range site.

This Astatula soil has slight limitations for most urban uses. This soil is a good source for roadfill. This soil has severe limitations for recreational development because it is too sandy, causing poor trafficability. Adding suitable topsoil or stabilizing the surface layer will reduce or overcome this limitation.

This Astatula soil is in capability subclass VIs.

10—Myakka fine sand. This nearly level, poorly drained soil is in low, broad, flatwood areas in the county. The mapped areas are irregular in shape and range from 10 to 200 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is black fine sand about 4 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and light brownish gray sand. The subsoil to a depth of about 80 inches is black and dark brown sand.

Included with this soil in mapping are small areas of Basinger, Immokalee, Placid, Satellite, Smyrna, and Valkaria soils. In most areas, the included soils make up 10 to 35 percent of the map unit.

The available water capacity of this Myakka soil is very low. The permeability is moderate. The water table is at a depth of less than 12 inches during the summer rainy season. Generally, it is at a depth of 12 to 40 inches during the rest of the year. During extended dry periods, the water table recedes to a depth of more than 40 inches. Also, this soil can have a perched water table because of the permeability of the subsoil.

A large part of the acreage of this soil has been cleared for improved pasture and vegetable crops and, in more recent years, has been used for citrus crops. Significant acreage remains in natural vegetation that consists mainly of slash pine, south Florida slash pine, longleaf pine, fetterbush, gallberry, running oak, waxmyrtle, and saw palmetto (fig. 3). Pineland threeawn is the dominant grass; but depending on range condition, there are significant amounts of creeping bluestem, lopsided indiangrass, chalky bluestem, and other grasses.

This Myakka soil has severe limitations for cultivated crops because of wetness and the sandy texture. With proper management and use of conservation practices, however, this soil is well suited to a variety of vegetable crops. A properly designed water control system will remove excess surface water during rainy periods and provide irrigation during dry periods. Proper management should include bedding in rows, regular applications of lime and fertilizer, and planting of soil-improving crops to protect the soil from erosion.

Citrus trees are moderately well suited to this soil if a properly designed water control system is established and maintained. This system should be designed to maintain the water table at an effective depth. Trees should be planted in bedded rows. Irrigation should be available during dry periods. Regular applications of lime and fertilizer are needed.

The potential of this soil for production of pasture and hay crops is moderate. Pangolagrass, bahiagrass, and white clover are best suited to this soil. A water control system should be used to remove excess surface water after heavy rainfall. Regular applications of lime and fertilizer are needed. Grazing should be controlled to prevent weakening of plants.

The potential of this soil for production of pine trees is moderate. Equipment use limitations and seedling mortality are concerns in management. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of range plants is moderate. This soil has the potential for producing significant amounts of creeping bluestem, chalky bluestem, and indiangrass. Grazing should be controlled to maintain plant vigor. Grazing time and number of cattle per acre are major considerations in a

Figure 3.—The natural vegetation on this Myakka fine sand is saw palmetto and slash pine.

good range management plan. This soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of wetness. The limitations for septic tank absorption fields can be overcome by backfilling and mounding to maintain the system above the seasonal high water table. For recreational development, this soil also has severe limitations because of wetness; but with proper drainage to remove excess surface water, most of the limitations can be overcome.

This Myakka soil is in capability subclass IVw.

11—Orsino sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on moderately high sandy ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 acres to more than 100 acres. The slopes are smooth to convex.

Typically, the surface layer is gray sand about 2 inches thick. The subsurface layer, to a depth of 46 inches, is white sand. The subsoil, to a depth of about 66 inches, is yellowish brown, reddish brown, and dark reddish brown sand. The substratum to a depth of 80 inches or more is very pale brown sand.

Included with this soil in mapping are small areas of Archbold, Duette, Paola, Pomello, St. Lucie, and Tavares soils. In most areas, the included soils make up 10 to 25 percent of the map unit.

The available water capacity of this Orsino soil is very low. The permeability is very rapid. The water table

is at a depth of 42 to 72 inches for 1 to 4 months during the summer rainy season. It recedes to a lower depth during the rest of the year.

Most of the acreage of this soil is in citrus crops or has been left in natural vegetation. Some areas have been cleared for improved pasture and cultivated crops. The natural vegetation consists of sand pine, slash pine, scrub hickory, Chapman oak, myrtle oak, and sand live oak. The understory consists of scattered saw palmetto, pineland threeawn, and other forbs.

This Orsino soil has very severe limitations for cultivated crops. Intensive management is required if the soil is cultivated. Droughtiness and rapid leaching of plant nutrients reduce the variety of adapted crops and their potential yields. Irrigation is advisable if adequate water is readily available.

Citrus trees are well suited to this soil. Good yields of oranges and grapefruit can be obtained in some years without irrigation. A properly designed irrigation system is needed to ensure consistent high yields.

The potential of this soil for production of pasture and hay crops is low. Bahiagrass and bermudagrass are well adapted to this soil. Regular applications of fertilizer and lime are needed. Grazing should be controlled to permit plants to recover from grazing and to maintain vigor.

The potential of this soil for production of pine trees is low. Equipment use limitations and seedling mortality are the main management problems. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for production of desirable range plants is very low. The plant community consists of a dense woody understory, which is seldom grazed by livestock. The dominate browse is pineland threeawn. This soil is in the Sand Pine Scrub range site.

This soil has moderate limitations for most urban uses because of the seasonal high water table. This soil has slight limitations for dwellings without basements, small commercial buildings, and local streets and roads. This soil has severe limitations for recreational development because it is too sandy. By adding suitable topsoil or by stabilizing the surface layer, this limitation can be overcome.

This Orsino soil is in capability subclass IVs.

12—Basinger fine sand. This nearly level, poorly drained soil is on the low flatwoods and in sloughs and poorly defined drainageways. The mapped areas are irregular in shape and range from 10 to 50 acres or more. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine sand.

Included with this soil in mapping are small areas of Felda, Immokalee, Myakka, Placid, and Valkaria soils. In some places are soils that are similar to Basinger soil, but the subsoil is not as brown as that in Basinger soil. In most areas, the included soils make up 10 to 25 percent of the map unit.

The available water capacity of this Basinger soil is low. The permeability is rapid. The water table is within 12 inches of the surface for 2 to 5 months during the summer rainy season. Generally, it is between depths of 12 and 40 inches for 6 months or more but may recede to a lower depth during extended dry periods.

Most of the acreage of this soil remains in natural vegetation. Large areas have been cleared for improved pasture and vegetable crops. The natural vegetation consists of slash pine, south Florida slash pine, gallberry, pineland threeawn, cutthroat grass, maidencane, bluestem, St. Johnswort, and cordgrass.

This Basinger soil has very severe limitations for cultivated crops because of wetness. This limitation can be partly overcome if a properly designed water control system is established and maintained to remove excess surface water during wet periods and to provide irrigation during dry periods. Lime or fertilizer should be added according to the need of the crops.

This soil is poorly suited to citrus trees; however, if a properly designed water control system is installed, citrus is suitable. Controlling the depth of the water table is vital to the success of growing citrus. Citrus should be planted in bedded rows, and irrigation should be provided during dry periods. A cover crop should be maintained between rows.

The potential of this soil for production of improved pasture grasses and hay crops is moderate. Pangolagrass, bahiagrass, and white clover are best adapted to this soil if well managed. A water control system to remove excess surface water after heavy rainfall is needed to ensure good yields. Fertilizer is needed on a regular basis. For pasture purposes, grazing should be controlled to maintain plant vigor.

The potential of this soil for production of pine trees

is moderate. Seedling mortality is the main concern in management because of wetness. Slash and south Florida pines are the preferred trees for planting.

The potential of this soil for the production of range plants is moderately high. This soil has the potential for producing high amounts of blue maidencane, chalky bluestem, and bluejoint panicum. To maintain the range, a good range management plan should include such considerations as grazing time and number of cows per acre. This soil is in the Slough range site.

This soil has severe limitations for urban uses because of wetness. Limitations for septic tank absorption fields can be overcome by mounding and backfilling to maintain the system above the seasonal high water table. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Providing a drainage system to remove excess surface water and adding suitable topsoil or resurfacing the area will overcome this limitation.

This Basinger soil is in capability subclass IVw.

13—Felda fine sand. This nearly level, poorly drained soil is on broad, low flats and in large drainageways in the flatwoods part of the county. The mapped areas are irregular in shape and range from 20 to more than 500 acres. The slopes are smooth and range from 0 to 1 percent.

Typically, the surface layer is gray fine sand about 7 inches thick. The subsurface layer, to a depth of 24 inches, is light gray and dark grayish brown fine sand. The subsoil, to a depth of 36 inches, is gray very fine sandy loam. The upper part of the substratum, to a depth of 68 inches, is light gray fine sand. The lower part to a depth of more than 80 inches is dark grayish brown fine sand.

Included with this soil in mapping are small areas of Bradenton, Hicoria, Malabar, Pineda, Tequesta, and Valkaria soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Felda soil is low. The permeability is moderate or moderately rapid. The water table is within 12 inches of the surface during the summer rainy season. During the rest of the year, the water table is between depths of 12 and 40 inches except during dry periods when it may recede to a lower depth.

Most of the acreage of this soil is in improved pasture and native rangeland. Some areas have been cleared for citrus crops. The natural vegetation consists of slash pine, south Florida slash pine, cabbage palm, waxmyrtle, pineland threeawn, various species of bluestems, sand cordgrass, maidencane, saw palmetto, and fetterbush.

Under natural conditions, this Felda soil has severe limitations for cultivated crops because of wetness; however, if a water control system is established and maintained, a variety of vegetable crops is suitable for this soil. The water control system is needed to remove excess surface water during wet periods and provide subsurface irrigation during dry periods. Fertilizer should be added according to the need of the crops.

This soil is poorly suited to citrus trees; however, if a properly designed water control system is established and maintained to regulate the water table, citrus is suitable. The trees should be planted in bedded rows to help maintain the root system above the water table. An irrigation system is needed, and fertilizer should be applied at regular intervals. Plant cover should be maintained between the rows to prevent erosion of the beds.

The potential of this soil for production of pasture and hay crops is moderate. A water control system is needed to remove excess surface water after heavy rainfall. White clover, pangolagrass, and bahiagrass are best adapted to this soil. Management practices require controlled grazing and regular applications of fertilizer for maximum yields.

The potential of this soil for production of pine trees is moderate. Seedling mortality and equipment use limitations during wet periods are the main concerns in management. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of desirable range plants is moderately high. This soil has the potential for producing significant amounts of maidencane, chalky bluestem, and bluejoint panicum. Carpetgrass, an introduced plant, tends to dominate the site under excessive grazing conditions; therefore, management of the native rangeland should include cattle rotation, crossfencing, and consideration of the number of cattle per acre based on the condition of the range and size of the site. This soil is in the Slough range site.

This soil has severe limitations for most urban uses because of the high water table. Building sites and septic tank absorption fields should be mounded because of wetness. By improving drainage, most of the limitations can be overcome.

This Felda soil is in capability subclass IIIw.

14—Satellite sand. This nearly level, somewhat poorly drained soil is on slightly elevated ridges on the

flatwoods and on the lower ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 10 to more than 100 acres. The slopes are generally smooth to convex and range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 4 inches thick. The underlying material to a depth of 80 inches is white fine sand that has brown mottles in the upper part of this horizon.

Included with this soil in mapping are small areas of Archbold, Basinger, Daytona, Duette, Immokalee, Myakka, and Pomello soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Satellite soil is very low. The permeability is very rapid. The water table is at a depth of 12 to 40 inches for 2 to 6 months.

Most of the acreage of this soil is in natural vegetation, but some areas have been cleared for pasture and citrus crops. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, myrtle oak, Chapman oak, and sand live oak. The understory consists of saw palmetto and pineland threeawn.

This Satellite soil has very severe limitations for cultivated crops. A water control system is needed to remove excess water in wet periods and provide irrigation during the dry periods. Soil-improving practices should be used, and regular applications of lime and fertilizer are needed if the soil is used for cultivated crops.

Citrus trees are moderately suited to this soil. A drainage system is needed to remove excess water during the rainy season and supply supplemental irrigation during the dry part of the year.

The potential of this soil for production of pasture and hay crops is moderate. Pangolagrass and bahiagrass are best adapted to this soil. Regular applications of lime and fertilizer are needed. Grazing should be controlled to maintain healthy plants for maximum production.

The potential of this soil for production of pine trees is low. Seedling mortality is the main management problem. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for the production of range plants is very low. The plant community consists of a woody understory, which is seldom grazed. This soil is in the Sand Pine Scrub range site.

This Satellite soil has severe limitations for most urban uses because the seasonal high water table is between depths of 15 and 40 inches. The limitations are severe for recreational development because the soil is too sandy. By adding suitable topsoil or stabilizing the surface, this limitation can be minimized.

This Satellite soil is in capability subclass VIs.

15—Bradenton fine sand. This nearly level, poorly drained soil is on hammocks and in open areas on the flatwoods. The mapped areas are irregular in shape and range from 5 to more than 50 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 14 inches, is light gray fine sand. The subsoil, to a depth of 44 inches, is gray very fine sandy loam. White calcium carbonate nodules are in the lower part of the subsoil. The substratum to a depth of 80 inches is light brownish gray and greenish gray loamy sand and very fine sandy loam.

Included with this soil in mapping are small areas of Felda, Hicoria, Malabar, and Pineda soils. In most areas, the included soils make up 15 to 20 percent of the map unit.

The available water capacity of this Bradenton soil is moderate. The permeability is moderate. The water table is within 12 inches of the surface during the summer rainy season. During the rest of the year, the water table is generally between depths of 12 and 40 inches except during dry periods when it may recede to a lower depth.

Most of the acreage of this soil is in improved pasture and native rangeland. A few areas have been cleared for citrus crops. The natural vegetation consists mostly of live oak, cabbage palm, a few pines, saw palmetto, and various species of bluestems and panicums.

This Bradenton soil has severe limitations for cultivated crops. The limiting factor is the high water table. If wetness can be overcome by providing drainage, a variety of vegetable crops is suitable for cultivation. A water control system is needed to remove excess water during wet periods and to provide irrigation during dry periods. Fertilizer should be added according to the specific need of the crops.

Citrus trees are well suited to this soil if a properly designed water control system is established and maintained to regulate the water table. Citrus trees should be planted in bedded rows so that the root system is well above the seasonal high water table. A cover crop should be maintained between rows to prevent erosion of the beds. Proper management should also include regular applications of fertilizer.

The potential of this soil for production of hay and pasture crops is moderate (fig. 4). A water control

Figure 4.—This improved pasture is on Bradenton fine sand. The cabbage palm hammocks are used for shade and as a resting area for the cattle.

system is needed to remove excess surface water during heavy periods of rainfall. White clover, improved bahiagrass, and pangolagrass are best adapted to this soil.

The potential of this soil for production of pine trees is high. The main concerns in management are seedling mortality and equipment use limitations during wet periods. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of desirable range plants is very low because of the dense canopy of palm trees. The shaded areas are preferred resting places for cattle and, as such, are generally severely grazed. This soil is in the Wetland Hardwood Hammock range site.

This soil has severe limitations for most urban uses because of wetness. Building sites for small buildings without basements should be mounded to prevent moisture problems caused by the high water table. Septic tank absorption fields should also be mounded to maintain the system above the seasonal high water table. Most of the wetness problems can be overcome by providing adequate drainage.

This Bradenton soil is in capability subclass IIIw.

16—Valkaria fine sand. This nearly level, poorly drained soil is on the low flatwoods and in sloughs and poorly defined drainageways. The mapped areas are irregular in shape and range from 10 to 100 acres or more. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is gray fine sand about 5 inches thick. The subsurface layer, to a depth of about 16 inches, is light gray fine sand. The subsoil, to a depth of 51 inches, is yellowish brown and light yellowish brown fine sand. The substratum to a depth of 80 inches or more is light gray fine sand.

Included with this soil in mapping are small areas of Basinger, Felda, Immokalee, Malabar, Myakka, and Satellite soils. In most areas, the included soils make

up 10 to 25 percent of the map unit.

The available water capacity of this Valkaria soil is low. The permeability is rapid. The water table is within 12 inches of the surface for 2 to 4 months during the summer rainy season. Generally, it is between depths of 12 to 40 inches for 6 months or more but may recede to a lower depth during extended dry periods.

Large areas of this soil have been cleared for improved pasture and vegetable crops. Many areas remain in natural vegetation that consists of slash pine, south Florida slash pine, gallberry, pineland threeawn, cutthroat grass, maidencane, bluestem, St. Johnswort, and cordgrass.

This Valkaria soil has very severe limitations for cultivated crops because of wetness, but this limitation can be partly overcome if a properly designed water control system is established and maintained to remove excess surface water during wet periods and provide irrigation during dry periods. Soil amendments should be added according to the need of the crops.

This soil is poorly suited to citrus trees. If a properly designed water control system is established and maintained to regulate the water table, however, citrus is suitable. Controlling the depth of the water table is vital to the success of growing citrus, which should be planted in bedded rows with a cover crop to prevent erosion. Irrigation should be available during extended dry periods.

The potential of this soil for production of improved pasture grasses and hay crops is moderate. Pangolagrass, bahiagrass, and white clover are best adapted to this soil if well managed. A water control system to remove excess surface water after heavy rainfall is needed to ensure optimum yields. On improved pasture sites, grazing should be controlled to maintain plant vigor.

The potential of this soil for production of pine trees is moderate. Because of wetness, seedling mortality and equipment use limitations are the main concerns in management. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of range plants is moderately high. This soil has the potential for producing high amounts of blue maidencane, chalky bluestem, and bluejoint panicum. To maintain the range, a good range management plan should include such considerations as grazing time and number of cattle per acre. This soil is in the Slough range site.

This soil has severe limitations for most urban uses because of wetness. Limitations for septic tank absorption fields can be overcome by mounding to maintain the system above the seasonal high water table. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Providing a drainage system to remove excess surface water and adding suitable topsoil or resurfacing the area will overcome this limitation.

This Valkaria soil is in capability subclass IVw.

17—Malabar fine sand. This nearly level, poorly drained soil is in low, narrow to broad sloughs or in poorly defined drainageways on the flatwoods. The mapped areas are irregular in shape and range from 10 to more than 100 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 14 inches, is light gray fine sand. The upper part of the subsoil, to a depth of 48 inches, is yellow, yellowish brown, and light yellowish brown fine sand. The lower part to a depth of more than 80 inches is greenish gray fine sandy loam.

Included with this soil in mapping are small areas of Basinger, Felda, Pineda, and Valkaria soils. In some places are soils that are similar to Malabar soil but have a layer of organic staining just above the loamy subsoil. In most areas, the included soils make up 15 to 25 percent of the map unit.

The available water capacity of this Malabar soil is low. The permeability is slow or very slow. The water table generally is within 12 inches of the surface for 2 to 6 months during the summer rainy season. During the rest of the year, it is generally between depths of 12 and 40 inches. During dry periods, the water table may recede to a lower depth for a short time.

Most areas of this soil are in improved pasture and native rangeland. The natural vegetation consists of slash pine, south Florida slash pine, cabbage palm, saw palmetto, waxmyrtle, gallberry, maidencane, various species of bluestems, pineland threeawn, and sedges.

This Malabar soil has severe limitations for cultivated crops because of wetness. If the high water table problem can be overcome by establishing and maintaining a suitable water control system, a variety of vegetable crops can be grown. Proper management practices should include crop rotation, cover crops in the rotation system, and applications of fertilizer according to the need of the crops.

This soil is poorly suited to citrus trees. Citrus trees can be adapted to this soil if a properly designed water control system can be constructed and maintained to regulate the water table at the proper depth and also to provide irrigation. Trees should be planted in bedded rows, and a cover crop should be maintained between

the rows to prevent erosion of the beds. Fertilizer should be applied at regular intervals.

The potential of this soil for production of pasture and hay crops is moderate. Pangolagrass, improved bahiagrass, and white clover are best adapted to this soil. A water control system is needed to remove excess surface water after heavy rainfall. Grazing should be controlled to prevent overgrazing and weakening of the plants. Regular applications of fertilizer are needed.

The potential of this Malabar soil for production of pines is moderate. The main management concerns are seedling mortality and equipment use limitations during wet periods. Bedding of the trees and a simple drainage system to remove excess surface water is needed if the potential productivity is to be realized. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of desirable range plants is moderately high. Significant amounts of creeping bluestem, South Florida bluestem, various panicums, and maidencane can be expected under good management that includes crossfencing, cattle rotation, and careful consideration of the number of cattle per site. This soil is in the Slough range site.

This soil has severe limitations for most urban uses because of wetness. Septic tank absorption fields should be mounded to maintain the system above the seasonal high water table. Building sites for small buildings without basements also should be mounded to prevent moisture problems because of wetness. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Providing a drainage system to remove excess surface water and adding suitable topsoil or resurfacing the area will overcome this limitation.

This Malabar soil is in capability subclass IVw.

18—Kaliga muck. This nearly level, very poorly drained, organic soil is in swamps and marshes. This soil is mainly in large, irregularly shaped areas in a marsh south of Lake Istokpoga. The mapped areas range from 15 to 200 acres. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the upper part of the surface layer is black muck about 6 inches thick. The lower part, to a depth of 39 inches, is dark brown muck. The underlying material, to a depth of 45 inches, is grayish brown very fine sand. Below that layer, to a depth of 68 inches, is dark gray very fine sandy loam. The lower part to a depth of 80 inches is grayish brown very fine sand.

Included with this soil in mapping are small areas of Felda, Hicoria, Samsula, and Tequesta soils. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Kaliga soil is very high. The permeability is slow or very slow. Under natural conditions, this soil is ponded for 6 to 9 months in most years. The water table is generally within 10 inches of the surface for the rest of the year.

Many areas of this soil have been drained for improved pasture and speciality crops. The smaller areas generally remain in natural vegetation of sweetbay, cypress, red maple, blackgum, willow, St. Johnswort, sawgrass, arrowhead, pickerelweed, and maidencane.

This Kaliga soil has very severe limitations for cultivated crops. This soil is well suited to a variety of vegetable crops if a properly designed water control system can be established and maintained. Because of the naturally high acidity, lime should be added to adjust the pH. In Highlands County, several areas of this soil are being used to grow speciality crops of caladium bulbs and sod.

With adequate drainage, this soil has very high potential for production of pasture and hay crops. Pangolagrass, hermarthria, white clover, and bahiagrass are best adapted to this soil. The water control system should maintain the water table near the surface to prevent excess oxidation of the organic material. Lime is needed on this soil, and also fertilizer that is high in potash and trace elements because they are generally deficient in organic soils.

This soil is not suited to citrus or pine trees.

The potential of this soil for producing significant amounts of desirable range plants is high. Maidencane and cutgrass are the most desirable plants. Many areas of this soil provide little or no vegetation that cattle prefer. Those areas that do produce desirable plants provide excellent forage during the normally dry winter months when the native rangeland is depleted. Marshes and swamps are additional benefits in a good range management program. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for urban and recreational uses. Ponding and low strength of the muck are hazards that are extremely difficult to overcome.

This Kaliga soil is in capability subclass IIIw.

19—Hicoria mucky sand, depressional. This nearly level, very poorly drained soil is in wet depressions. This soil is ponded for much of the year. The mapped areas range from 3 to 40 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the upper part of the surface layer is black mucky sand about 4 inches thick. The lower part, to a depth of 15 inches, is black fine sand. The subsurface layer, to a depth of 21 inches, is light gray sand. The upper part of the subsoil, to a depth of 39 inches, is dark gray fine sandy loam. The lower part, to a depth of 52 inches, is grayish brown fine sandy loam. The substratum to a depth of 80 inches is dark gray fine sandy loam.

Included with this soil in mapping are small areas of Felda, Placid, Sanibel, and Tequesta soils. In places are areas of soils that are similar to Hicoria soil, but they have a fine textured subsoil at a depth of more than 40 inches. The included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Hicoria soil is high. The permeability is moderately slow or slow in the subsoil. In most areas, this soil is ponded most of the year. The water table is at a depth of 10 inches or less much of the rest of the year. It can recede to a lower depth during extended dry periods and during the winter.

Some areas of this soil have been drained for improved pasture, but most remain in natural vegetation. The natural vegetation consists of cypress, red maple, blackgum, willow, and bay trees and pickerelweed, arrowhead, maidencane, sawgrass, and other water-tolerant plants.

Under natural conditions, this Hicoria soil has very severe limitations for cultivated crops. Ponding, internal drainage, and unavailability of suitable drainage outlets severely restrict the use of this soil. If a properly designed water control system can be established and maintained, most cultivated crops can be grown.

This soil is not suited to citrus trees unless a proper water control system can be established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, improved pasture can be established if excess surface water is removed. A good drainage system is needed for best results. Lime and fertilizer should be added according to the need of the plants. White clover, bahiagrass, and pangolagrass are best adapted to this soil.

Under natural conditions, this soil is not suited to slash or longleaf pines because of excessive wetness and ponding.

The potential of this Hicoria soil for the production of range plants is high. This soil has the potential for producing significant amounts of maidencane and cutgrass. Although many areas of this soil produce very small amounts of desirable range plants, some do and are valuable assets to a good native rangeland management program. These more productive areas are not grazed during wet periods and grazing is deferred until winter when other range plants are of reduced value and quantity. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for all urban and recreational uses because of ponding. Good drainage systems that will adequately remove the water and regulate the water table are expensive and difficult to establish and maintain. Most areas do not have adequate water outlets; and even if the soil is drained, the problem of keeping the areas adequately drained is a continuing hazard.

This Hicoria soil is in capability subclass VIIw.

20—Samsula muck. This nearly level, very poorly drained, organic soil is in depressions, swamps, and marshes. The mapped areas vary considerably in shape and size. Generally, the smaller areas are circular and range from 3 to 15 acres, and the larger areas are very irregular in shape and range from 50 to more than 200 acres. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black muck about 36 inches thick. The upper part of the underlying material, to a depth of 45 inches or more, is black sand. The lower part, to a depth of 65 inches or more, is dark gray, grayish brown, and gray sand.

Included with this soil in mapping are small areas of Basinger, Hontoon, Placid, and Sanibel soils. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Samsula soil is high. The permeability is rapid. Under natural conditions this soil is ponded for 6 to 9 months in most years. The water table is at a depth of 10 inches or less for the rest of the year.

Many areas of this soil have been drained for improved pasture, vegetable crops, and specialty crops. Many small areas remain in native vegetation of cypress, sweetbay, red maple, St. Johnswort, sawgrass, waxmyrtle, arrowhead, pickerelweed, and maidencane.

This Samsula soil has very severe limitations for cultivated crops; however, if the soil is drained, a variety of crops can be grown. A properly designed and maintained water control system is required. Lime is essential for maximum production. Fertilizer should be added according to the need of the crops. In Highlands County, several areas of this soil have been drained

and are being used to grow caladium bulbs, a specialty crop.

With adequate drainage, this soil has very high potential for production of pasture and hay crops. Pangolagrass, white clover, and bahiagrass are best adapted to this soil. A water control system is needed to maintain the water table near the surface to prevent excess oxidation and subsidence of the organic material. Lime is needed on this soil, and fertilizer that is high in potash and trace elements should also be applied because they are generally deficient in organic soils.

This soil is not suited to citrus or pine trees. Citrus crops can be adapted to this soil if a specially designed water control system is established and maintained to regulate the water table.

The potential of this soil for producing significant amounts of desirable range plants is high. Maidencane and cutgrass are the most desirable. Many areas of this soil provide little or no vegetation that cattle prefer. Those areas that do produce desirable plants provide excellent forage during the winter and during dry periods. Marshes and swamps are additional benefits in a good range management plan. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for urban and recreational use. Installing water control systems, removing the organic material, and backfilling with suitable soil material are necessary for most uses.

This Samsula soil is in capability subclass IVw.

21—Hontoon muck. This nearly level, very poorly drained, organic soil is in the marshes and swampy areas. Most mapped areas range from 5 to 50 acres, but a few areas range from 100 to more than 500 acres. These areas are irregular in shape. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the upper part of the organic surface layer is dark reddish brown muck 15 inches thick. Below this layer, to a depth of 65 inches, is black muck. The upper part of the underlying material, to a depth of 73 inches, is black mucky sand. The lower part to a depth of more than 80 inches is dark gray sand.

Included with this soil in mapping are small areas of Basinger, Placid, and Samsula soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Hontoon soil is very high. The permeability is rapid. Under natural conditions, this soil has a water table at or above the surface except during extended dry periods.

Many areas of this soil have been cleared and drained for improved pasture, vegetable crops, and caladium plants and bulbs, a specialty crop. In a few of the larger areas, the muck is being commercially mined. Some areas remain in natural vegetation of sweetbay, blackgum, and other water-tolerant trees. The understory consists of fern, maidencane, sawgrass, and pickerelweed.

This Hontoon soil has very severe limitations for cultivated crops; however, if the soil is drained, a variety of crops are adapted. A properly designed and maintained water control system is required. Fertilizer should be applied according to the need of the crops, and lime should be added to these very acid soils to maintain high quality and obtain maximum yields.

With adequate drainage, hay and pasture crops have very high production potential. Pangolagrass, white clover, and bahiagrass are best adapted to this soil. The water control system should maintain the water table near the surface to prevent excess oxidation and subsidence of the organic material. Lime is needed on this soil, and fertilizer that is high in potash and trace elements should also be applied because these are generally deficient in organic soils.

This soil is not suited to citrus or pine tree production.

The potential of this soil for the production of desirable range plants is high. This soil has the potential for producing significant amounts of maidencane and cutgrass. These marshes produce high quality forage during droughts and during the winter when other areas do not produce a great amount of forage. Management of this native rangeland should include consideration of the number of cattle that use the site for a specific period of time. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for urban and recreational uses because of the high water table and the very low bearing strength of the muck. Major reclamation is needed before this soil can be used for urban development.

This Hontoon soil is in capability subclass IIIw.

22—Brighton muck. This nearly level, very poorly drained, organic soil is in forested swamps and marshes. The mapped areas vary considerably in size and shape. The largest mapped areas are on the southern side of Lake Istokpoga and range from 10 to more than 200 acres. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black muck about 12 inches thick. Below that layer to a depth of 80 inches or more is dark reddish brown peat.

Included with this soil in mapping are small areas of Gator, Hontoon, Kaliga, and Samsula soils. In places are soils that are similar to Brighton soil, but they are at a depth of less than 51 inches. In most areas, the included soils make up 5 to 10 percent of the map unit.

The available water capacity of this Brighton soil is very high. The permeability is rapid. Under natural conditions, this soil is ponded for 6 to 9 months in most years. The water table is generally at a depth of less than 10 inches the rest of the year but may recede to a depth of more than 10 inches during long, dry periods.

Many areas of this soil have been drained for improved pasture and specialty crops. Many areas remain in natural vegetation of bays, red maple, and other water-tolerant trees and sawgrass, waxmyrtle, arrowhead, pickerelweed, and other aquatic plants.

This Brighton soil has very severe limitations for cultivated crops; however, if the soil is drained, a variety of crops are well suited. A properly designed and maintained water control system is required. Lime is needed to raise the pH for specialty crops and improved pasture. Fertilizer should be added according to the need of the crops. Many areas of this soil have been drained and cleared for growing caladiums. Large areas in this use are on the southern side of Lake Istokpoga.

With adequate drainage, the soil has very high potential for production of pasture and hay crops. Bahiagrass and white clover are best adapted to this soil. The water control system should maintain the water table at or near the surface to prevent excess oxidation and subsidence of the organic material. Lime and fertilizer that is high in potash and trace elements are essential to maintain the pasture.

This soil is not suited to citrus or pine trees. Citrus crops can be adapted to this soil if a specially designed water control system is established and maintained.

The potential of this soil for the production of desirable range plants is high. This soil has the potential for producing significant amounts of maidencane and cutgrass. These marshes produce high quality forage during droughts and during the winter when other areas do not produce a great amount of forage. Management of this native rangeland should include consideration of the number of cattle that use the site for a specific period. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for urban and recreational uses. Ponding and low strength of the organic material are hazards that are extremely difficult to overcome.

This Brighton soil is in capability subclass IIIw.

23—Gator muck. This nearly level, very poorly drained soil is in swamps, marshes, and wet depressions. The mapped areas are irregular in shape and range from 5 to more than 500 acres. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black muck about 18 inches thick. The upper part of the underlying material, to a depth of 36 inches, is very dark gray sandy clay loam. The next layer, to a depth of 55 inches, is a stratified layer of dark grayish brown sandy loam and loamy sand. The lower part to a depth of 80 inches or more is a mixture of dark gray and gray sand.

Included with this soil in mapping are small areas of Chobee, Hicoria, and Tequesta soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Gator soil is high. The permeability is slow or very slow. Under natural conditions this soil is ponded for 6 to 9 months in most years. The water table is generally within 10 inches of the surface for the rest of the year.

Most of the larger areas of this soil have been drained for improved pasture. The smaller areas generally remain in natural vegetation of sweetbay and other water-tolerant trees and waxmyrtle, arrowhead, pickerelweed, and maidencane.

This Gator soil has very severe limitations for cultivated crops. This soil is well suited to a variety of vegetable crops if a properly designed water control system can be established and maintained.

With adequate drainage, this soil has very high potential for production of pasture and hay crops. Pangolagrass, white clover, and bahiagrass are best adapted to this soil. The water control system should maintain the water table near the surface to prevent excess oxidation of the organic material. Fertilizer high in potash and trace elements is recommended as these are generally deficient in organic soils.

This soil is not suited to citrus or pine trees.

The potential of this soil for producing significant amounts of desirable range plants is high. Maidencane and cutgrass are the most desirable. The productive areas provide excellent forage for cattle during the normally dry winter months when the native rangeland is depleted. Such areas are beneficial in a good range management program. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for urban and recreational uses. Ponding and low strength of the muck are hazards that are extremely difficult to overcome.

This Gator soil is in capability subclass IIIw.

24—Pineda sand. This nearly level, poorly drained soil is on low, narrow to broad flats and in sloughs or poorly defined drainageways in the flatwoods part of the county. The mapped areas are irregular in shape and range from 10 to more than 50 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 4 inches thick. The subsurface layer, to a depth of 12 inches, is light gray sand. The upper part of the subsoil, to a depth of 30 inches, is brownish yellow sand. The lower part, to a depth of 56 inches, is light brownish gray sandy clay loam and sandy loam. The substratum to a depth of more than 80 inches is brown and light greenish gray sand.

Included with this soil in mapping are small areas of Basinger, Felda, Malabar, and Valkaria soils. In most areas, the included soils make up 10 to 25 percent of the map unit.

The available water capacity is low. The permeability is slow or very slow. The water table is within 12 inches of the surface during the summer rainy season. During the rest of the year, it is between depths of 12 and 40 inches except during dry periods when it can recede to a lower depth.

Most areas of this soil are in improved pasture and native rangeland. The natural vegetation consists of cabbage palm, water oak, south Florida slash pine, waxmyrtle, slash pine, sand cordgrass, pineland threeawn, saw palmetto, and various species of bluestems.

Under natural conditions, this Pineda soil has severe limitations for cultivated crops because of wetness. This limitation can be partly overcome if a properly designed water control system can be established and maintained to remove excess surface water during the wet periods and to provide irrigation during dry periods. Good management practices should include using a cover crop and applying fertilizer according to the need of the crops.

This soil is poorly suited to citrus trees; however, they can be adapted to this soil if a properly designed water control system is established and maintained. The system should maintain the water table at the proper depth and also provide irrigation during dry periods. Trees should be planted in bedded rows, and a cover crop should be maintained between rows to prevent erosion of the beds. Fertilizer should be applied at regular intervals.

The potential of this soil for production of pasture and hay crops is moderate. A water control system is needed to remove excess surface water during periods of heavy rainfall. Bahiagrass, white clover, and pangolagrass are best adapted to this soil. Management practices should include regular applications of fertilizer, and grazing should be controlled to obtain maximum yields.

The potential of this soil for production of pine trees is moderately high. The main concerns in management are seedling mortality and equipment use limitations during wet periods. Bedding of the trees and a simple drainage system to remove excess surface water is needed if the potential productivity is to be realized. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for the production of desirable range plants is moderate. The grazing sites on this soil are preferred because of the high quality and quantity of forage, such as maidencane, chalky bluestem, and creeping bluestem. Management practices should include crossfencing, cattle rotation, and consideration to the specific number of cattle per site. This soil is in the Slough range site.

This soil has severe limitations for most urban uses because of the high water table. Septic tank absorption fields should be mounded to maintain the system above the seasonal high water table. Building sites for small buildings without basements also should be mounded to prevent moisture problems because of wetness. This soil also has severe limitations for recreational development because of wetness and the sandy texture. These limitations can be overcome by using a drainage system to remove excess surface water and by adding suitable topsoil or stabilizing the surface layer.

This Pineda soil is in capability subclass IIIw.

25—Chobee fine sandy loam, depressional. This nearly level, very poorly drained soil is in depressions on the flatwoods and in swamps and marshes. The mapped areas range from 3 to 40 acres. The slopes are smooth to concave and range from 0 to 1 percent.

Typically, the surface layer is black fine sandy loam about 18 inches thick. The upper 3 inches of that layer is stratified muck and fine sandy loam. The subsoil, to a depth of 57 inches, is gray and dark gray sandy clay loam and fine sandy loam. The substratum to a depth of 80 inches is gray fine sand.

Included with this soil in mapping are small areas of Felda, Hicoria, Placid, and Tequesta soils. In places are areas of soils that are similar to Chobee soil. These similar soils have either an organic layer that is more than 6 inches thick above the mineral horizon or a fine textured subsoil at a depth of more than 40 inches, or have both. In most areas, the included soils make up 10

to 15 percent of the map unit.

The available water capacity of this Chobee soil is moderate. The permeability is slow or very slow. This soil is ponded most of the year. Much of the rest of the year, the water table is at a depth of 10 inches or less. Generally, in dry periods during the winter, it recedes to a lower depth.

Some areas of this soil have been drained for improved pasture, but most areas remain in natural vegetation, which consists of cypress, bays, red maple, and other water-tolerant trees. The understory in marsh areas consists of pickerelweed, arrowhead, waxmyrtle, sawgrass, and other water-tolerant plants.

Under natural conditions, this Chobee soil has very severe limitations for cultivated crops. Ponding, internal drainage, and unavailability of drainage outlets severely restrict the use of this soil. Cultivated crops can be grown only if suitable drainage outlets can be installed and maintained.

This soil is not suited to citrus trees unless a water control system can be established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, improved pasture can be established on this soil if excess water is removed. A good drainage system is needed for best results. Lime and fertilizer should be added according to the need of the plants. White clover, bahiagrass, and pangolagrass are best adapted to this soil.

This soil is not suited to pine tree production because of ponding and excessive wetness.

The potential of this soil for the production of range plants is high. The soil has the potential for producing significant amounts of maidencane and cutgrass. Although many areas of this soil produce small amounts of desirable range plants, some do and are highly valuable assets to a good native range management program. The more productive areas are not grazed during wet periods, and grazing is deferred until winter when other range plants are of reduced value and quantity. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for all urban and recreational uses because of ponding. Drainage and large amounts of fill material are needed to make this soil suitable for urban use. Most areas do not have suitable drainage outlets to remove excess water.

This Chobee soil is in capability subclass VIIw.

26—Tequesta muck. This nearly level, very poorly drained soil is in marshes and depressions in the county. This soil also is along the Kissimmee River flood plain in former oxbows and dendritic patterns leading into the river. Generally, the mapped areas range from 5 to 300 acres, but a few areas are much larger. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the organic surface layer is black muck about 12 inches thick. Below that layer, to a depth of 17 inches, is black fine sand. The subsurface layer, to a depth of 32 inches, is light brownish gray fine sand. The subsoil, to a depth of 77 inches, is dark gray fine sandy loam. The substratum to a depth of 80 inches or more is light gray fine sand.

Included with this soil in mapping are small areas of Basinger, Hicoria, Kaliga, and Sanibel soils. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Tequesta soil is moderate. The permeability is moderately slow. Under natural conditions, this soil is ponded for most of the year. The water table is within 10 inches of the surface the rest of the year.

Large areas of this soil have been cleared and drained for improved pasture, citrus crops, and hay crops. The natural vegetation consists of arrowhead, waxmyrtle, pickerelweed, sawgrass, and other water-tolerant grasses. A few areas are in water-tolerant trees.

Under natural conditions, this Tequesta soil has very severe limitations for cultivated crops. Many areas of this soil have been drained and are used for caladiums and citrus crops and for limited vegetable crops.

Citrus crops are well suited to this soil if the trees are planted in bedded rows and if proper drainage is established and maintained to regulate the water table. Suitable water outlets should be installed. Fertilizer and lime should be added to obtain maximum yields.

Improved pasture and hay crops can be established if a good drainage system to remove excess surface water is installed and maintained. Lime and fertilizer should be added as needed. White clover, bahiagrass, and pangolagrass are the recommended plants for this soil. Production potential is very high.

This soil is not suited to pine tree production. Excess wetness and ponding are the limiting factors.

The potential of this soil for production of range plants is high. This soil has the potential for producing significant amounts of maidencane and cutgrass and is a highly valuable asset in a good native range management program. Areas of this soil are not grazed during wet periods, and grazing is deferred until winter when other range plants are of reduced value and

quantity. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for most urban and recreational uses. The seasonal high water table and ponding must be considered in the planning and design for the intended use. Special designs, soil reclamation, or planned maintenance after installation should be considered as ways of overcoming the limitations.

This Tequesta soil is in capability subclass IIIw.

28—Archbold sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on moderately high ridges in the ridge part of the county. The mapped areas are irregular in shape and range from 15 to 75 acres. The slopes are smooth to convex.

Typically, the surface layer is gray sand about 4 inches thick. The underlying material to a depth of 80 inches or more is white sand.

Included with this soil in mapping are small areas of Duette, Orsino, Paola, Pomello, St. Lucie, and Satellite soils. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Archbold soil is very low. The permeability is very rapid. The water table is at a depth of 40 to 60 inches during the summer rainy season. It recedes to a lower depth during the rest of the year.

Most areas of this soil remain in native scrub forests. Small areas have been cleared for citrus crops and improved pasture. The natural vegetation consists of sand pine, south Florida slash pine, Chapman oak, myrtle oak, and sand live oak. The understory consists of saw palmetto and scattered pineland threeawn.

Without irrigation, this Archbold soil has very severe limitations for cultivated crops. Droughtiness and rapid leaching of plant nutrients reduce the potential yields.

Citrus trees are moderately well suited to this soil if a good irrigation system is installed and maintained. To maximize yields, management practices should include proper cover between rows and timely applications of lime and fertilizer because of rapid leaching.

The potential of this soil for production of improved pasture grasses and hay crops is low. Fertilizer and lime are needed. Grazing should be controlled to maintain plant vigor.

The potential of this soil for production of pine trees is low. Equipment use and seedling mortality are the main concerns in management. Sand, slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for the production of range plants is very low. The plant community consists of a dense woody understory, which is seldom grazed by cattle. The dominate forage is pineland threeawn. This soil is in the Sand Pine Scrub range site.

This soil has moderate limitations for most urban and recreational uses because of the sandy texture and also because the seasonal high water table is between depths of 40 and 60 inches. For the most part, these limitations are easily overcome by special designs and soil reclamation, such as surfacing with suitable topsoil in conjunction with continued maintenance.

This Archbold soil is in capability subclass VIs.

29—Pomona sand. This nearly level, poorly drained soil is in the low, flatwood areas that are adjacent to the Hardee County line. The mapped areas are irregular in shape and range from 10 to 50 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is black sand about 6 inches thick. The subsurface layer, to a depth of 29 inches, is gray and light gray sand. The upper part of the subsoil, to a depth of 51 inches, is dark brown and very dark grayish brown sand coated with organic matter. Below that layer, to a depth of 61 inches, is light brownish gray sand. The lower part to a depth of 80 inches or more is gray sandy loam.

Included with this soil in mapping are small areas of Basinger, EauGallie, Felda, Myakka, and Placid soils. In places is a soil that is similar to Pomona soil, but it has a loamy subsoil at a depth of less than 40 inches. In most areas, the included soils make up 20 to 50 percent of the map unit.

The available water capacity of this Pomona soil is moderate. The permeability is moderately slow or slow. The water table is at a depth of less than 12 inches during the summer rainy season. Generally, during the rest of the year, it is at a depth of 12 to 40 inches and recedes to a lower depth during extended dry periods. Also, this soil can have a perched water table because of the permeability of the subsoil.

Most areas of this soil are in native rangeland or improved pasture. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, waxmyrtle, fetterbush, gallberry, and saw palmetto. Pineland threeawn is the dominant grass; but depending on range condition, there are significant amounts of creeping bluestem, chalky bluestem, bushy bluestem, lopsided indiangrass, maidencane, and other grasses.

This Pomona soil has severe limitations for cultivated crops. The root zone is limited by a water table that is at a depth of less than 12 inches in wet seasons. The

potential of this soil for producing a variety of vegetable crops is moderate. To reach this potential, a water control system to remove excess water in rainy seasons and to provide subsurface irrigation in dry seasons is required. Crop residue and cover crops are needed to protect the soil from erosion. Seedbed preparation should include bedding in rows.

Citrus trees are moderately well suited to this soil if a properly designed water control system is established and maintained. This system should maintain the water table at an effective depth and also provide for irrigation during dry periods. Timely and regular applications of lime and fertilizer are needed.

The potential of this soil for production of improved pasture grasses is moderate. Pangolagrass, white clover, and bahiagrass grow well if properly managed. A water control system is needed to remove excess surface water after heavy rainfall. Regular applications of fertilizer and lime are needed. Grazing should be controlled to prevent overgrazing and weakening of the plants.

The potential of this soil for production of pine trees is moderately high. Seedling mortality and equipment use limitations during wet periods are the main management problems. Surface ditches to remove excess water are needed. Trees should be planted in bedded rows. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for production of range plants is moderate. Significant amounts of creeping bluestem, chalky bluestem, indiangrass, and various panicums can be produced on this soil. Improper range management causes a decrease in these forage plants and increases the amount of undesirable plants, such as pineland threeawn, saw palmetto, and carpetgrass. To avoid this, several range management practices can be implemented, such as deferred grazing, brush control, and proper stocking. This soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of the high water table. To overcome this limitation, building sites as well as septic tank absorption fields should be mounded. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Water control systems are necessary but are normally difficult to install because adequate water outlets are not available. The sandy texture limitation can be overcome by adding suitable topsoil or resurfacing the area.

This Pomona soil is in capability subclass IVw.

30—Oldsmar fine sand. This nearly level, poorly drained soil is in the flatwood areas that are adjacent to sloughs and streams in the county. The mapped areas are irregular in shape and range from 10 to 50 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of 32 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of 54 inches, is black, dark brown, and brown fine sand. The lower part, to a depth of 60 inches, is grayish brown sandy clay loam. The substratum to a depth of 80 inches is yellowish brown fine sand.

Included with this soil in mapping are areas of EauGallie, Immokalee, Myakka, and Smyrna soils. In places are soils that are similar to Oldsmar soil, but they have a loamy or clayey layer within 40 inches of the surface. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Oldsmar soil is low. The permeability is slow or very slow. The water table is within 12 inches of the surface during the summer rainy season. It is at a depth of 12 to 40 inches the rest of the year. The water table may be perched above the upper part of the subsoil during periods of high rainfall.

Most of the acreage of this soil is in native rangeland or improved pasture. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, chalky bluestem, pineland threeawn, low panicum, scattered hypericum, and other native forbs and grasses.

This Oldsmar soil has severe limitations for cultivated crops. Drainage must be provided to remove excess surface water and to regulate the seasonal high water table. The water control system should be designed to provide irrigation as well. With these measures in place, many vegetable crops, such as watermelon, tomatoes, peppers, cabbage, and cucumbers can be grown.

Citrus trees are well suited to this soil but should be extensively managed by establishing and maintaining a proper water control system to regulate the water table. Management practices should also include planting the trees in bedded rows, maintaining adequate drainage outlets, planting a cover crop between the rows to control erosion, applying proper fertilizer, and controlling insects and disease.

The potential of this soil for the production of pasture and hay crops is moderate. Excess surface water should be removed as quickly as possible.

Pangolagrass, bahiagrass, and clover are suited to this soil.

The potential of this soil for production of pine trees is moderately high. Seedling mortality and wetness are the main management problems. Slash and south Florida slash pines are the preferred trees for planting.

The potential of this soil for production of range plants is moderate. This soil has the potential to produce significant amounts of creeping bluestem, chalky bluestem, indiangrass, and various panicums. As the range deteriorates, pineland threeawn and saw palmetto dominate the site. To avoid this, management should include crossfencing, cattle rotations, and careful consideration as to the number of cattle per acre based on range condition and size of the site. This soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of wetness. Septic tank absorption fields should be mounded. Dwelling foundations and slabs should also be placed on suitable backfill material to prevent moisture problems associated with the seasonal high water table. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Many of the associated urban and recreational limitations can be overcome by providing drainage to control the high water table. This is a common practice in many urban areas within the county. The sandy texture limitation can be overcome by adding suitable topsoil or by resurfacing the area.

This Oldsmar soil is in capability subclass IVw.

31—Felda fine sand, depressional. This very poorly drained soil is in small to large depressions on the flatwoods part of the county. The mapped areas are mainly circular but also occur in long, narrow bands. Most mapped areas are 10 to 40 acres, but some areas are more than 100 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is dark gray fine sand about 5 inches thick. The subsurface layer, to a depth of 31 inches, is light gray fine sand. The upper part of the subsoil, to a depth of 38 inches, is dark grayish brown fine sandy loam. The lower part, to a depth of 70 inches, is gray fine sandy loam and has olive mottles. The substratum to a depth of 80 inches is gray fine sand and has streaks and lenses of loamy fine sand.

Included with this soil in mapping are small areas of Basinger, Hicoria, Kaliga, Malabar, and Sanibel soils. In places are soils that are similar to Felda soil, but they have loamy materials at a depth of less than 20 inches. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Felda soil is low. The permeability is moderately rapid or moderate. This soil is ponded for 6 months or more in most years. During the dry, winter months, the water table recedes, but it generally stays within 24 inches of the surface.

Most acreage of this soil is in natural vegetation, which consists of pickerelweed, arrowhead, maidencane, St. Johnswort and some forested areas of redbay, red maple, cypress, and other water-tolerant trees.

This Felda soil has very severe limitations for cultivated crops because of ponding. Most places do not have suitable drainage outlets, but if outlets are available, this soil can be cultivated by establishing and maintaining a properly designed water control system.

Citrus trees are not suited to this soil unless a water control system is established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, if adequate measures are taken to remove excess surface water and intensive management is practiced, the potential of this soil for production of improved pasture grasses is moderate. Pangolagrass, bahiagrass, and white clover are best adapted to this soil. A controlled grazing system should be used to maintain plant vigor. Regular applications of lime and fertilizer are needed.

This soil is not suited to commercial production of pine trees. Some forested areas of baldcypress do produce significant amounts of wood. Harvesting of the trees is difficult because of severe ponding and because drainage outlets are not available.

The potential of this soil for the production of range plants is high. The dominant forage is maidencane. Because of ponding, these areas are given a resting time from grazing and provide additional forage during the dry, winter months. The periods of ponding can also reduce the grazing value of the forage. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for building sites, sanitary facilities, and recreational development. Extensive measures must be taken for most urban uses. Adequate drainage outlets are not available, and the cost of site improvement generally outweighs the benefits of urban development.

This Felda soil is in capability subclass VIIw.

32—Arents, very steep. Arents consists of excessively drained, unconsolidated soil material that has been excavated from major canals and redeposited along the sides of the canals. The major extent of this

soil is along the Harney Pond Canal, South Florida Water Management Canal, Istokpoga Canal, and various canals dug in the Kissimmee River for flood control. Arents soil is also scattered throughout the county wherever major canals for agriculture and lake level water control canals and structures have been installed. These areas vary in size and shape depending on the size of the adjacent canal, and the height is 8 to 25 feet. Areas of Arents are generally smoothed at the top and are used as access roads. The side slopes range from 45 to 65 percent.

The texture and thickness of the layers of this soil are highly variable from site to site. Most areas contain remnants of former soil horizons and shell fragments. A typical profile has a surface layer of olive gray fine sand about 2 inches thick. Below that layer are various layers of fine sand and loamy material from former natural horizons. Colors vary from black, gray, olive brown, to white. Some layers have various amounts of shell fragments.

Included with this soil in mapping are soils in areas along the Kissimmee River that are less than 8 feet thick. These soils are not excessively drained. Generally, these areas are where normal dredge operations did not deposit material thick enough over the existing soil. Also, some areas are mapped Arents in other parts of the county where soil material has been deposited over natural soil. These areas are generally associated with urban land use that elevates structures and buildings well above a high water table. The natural drainage of these soils depends on the thickness of the fill material and the natural soil that is being covered.

The available water capacity of this soil is variable but generally is low. The permeability is variable but generally is rapid to moderate. The water table is at a depth of more than 72 inches. Natural fertility is low.

This soil is generally not suited to pasture, rangeland, or cropland because of steepness and limited size. Some areas in the county are planted to citrus crops, and the soil seems to be adapted to this use.

Arents soil is not well suited to urban and recreational uses because of limited size and steepness. Seepage can be a problem on soils used as septic tank absorption fields. In some areas, this soil is used for building sites. These areas have been shaped so that they do not have a slope problem; therefore, most of the severe limitations are eliminated for urban use. These areas are highly variable in thickness and texture. It is recommended that each site be investigated for existing limitations before use. For onsite investigation contact the Highlands Soil and Water Conservation District.

This soil has not been assigned a capability subclass.

33—Basinger, St. Johns, and Placid soils. These nearly level, poorly drained and very poorly drained soils are in seep areas in the county. Locally, they are called cutthroat seeps because of the cutthroat grass that grows vigorously in these areas. Generally, these seep areas are in association with the central ridge in the county. They are the result of water seeping from a higher to a lower position on the landscape. These areas tend to remain wetter for longer periods than similar soils outside the seep areas. The mapped areas range from 50 to more than 1,000 acres. The slopes are dominantly 0 to 2 percent but occasionally range up to 5 percent near the edge of ridges.

The composition of soils in these cutthroat seep areas is highly variable. Similarity of landscape position, land use, and management preclude mapping the soils separately. Some areas contain all three soils while others contain only one of the named soils. The percentage composition is highly variable, although most mapped areas are dominated by one of the major soils.

Typically, the surface layer of Basinger soil is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand with many bodies of dark grayish brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine sand.

Typically, the surface layer of St. Johns soil is black sand about 11 inches thick. The subsurface layer, to a depth of 26 inches, is light brownish gray sand. The upper part of the subsoil, to a depth of 31 inches, is very dark brown sand. The next layer, to a depth of 49 inches, is black sand. The next layer, to a depth of 70 inches, is dark yellowish brown sand. The lower part to a depth of 80 inches is very dark gray sand.

Typically, the surface layer of Placid soil is black sand about 7 inches thick. Below that layer, to a depth of 14 inches, is very dark gray sand. The underlying material to a depth of 80 inches is gray sand.

Included in mapping are small areas of Myakka, Samsula, Sanibel, and Smyrna soils. Some places have small areas of a soil that is similar to Placid soil, but the soil has a surface layer that is more than 24 inches thick.

The available water capacity of Basinger and Placid

soils is low. It is moderate in St. Johns soil. The permeability of Basinger and Placid soils is rapid, and it is moderate or moderately slow in the subsoil of St. Johns soil. The soils in this map unit have a water table within 12 inches of the surface most of the year. Interspersed throughout the map unit are shallow depressions that are ponded for several months during the rainy season.

The natural vegetation consists dominantly of cutthroat grass, pineland threeawn, longleaf pine, south Florida slash pine, and slash pine. Other vegetation in some areas includes St. Johnswort, waxmyrtle, creeping bluestem, fetterbush, gallberry, maidencane, and saw palmetto and bay trees.

The soils in this map unit have severe limitations for cultivated crops; however, crops are well suited to these soils if good drainage is provided. Fertilizer and lime should be added according to the needs of the crop.

These soils are poorly suited to citrus trees; however, if a well designed water control system is installed, citrus crops are suitable. Citrus trees should be planted in bedded rows, and an irrigation system is needed during dry periods to maximize yields. A cover crop should be grown between the tree rows to control erosion.

The potential of these soils for the production of pasture and hay crops is moderate if a water control system is established and maintained to remove excess surface water. Bahiagrass and pangolagrass are suited to these soils.

The potential of these soils for production of pine trees is moderately high. Seedling mortality because of wetness is the main management problem, but once established, slash pine and longleaf pine do very well on these sites. Seedlings should be planted in bedded rows. Slash pine and south Florida slash pine are the preferred trees for planting.

The potential of these soils for production of range plants is moderately high. The dominant forage is cutthroat grass with significant amounts of creeping bluestem. Grazing time and number of cattle per acre should be considered in a good range management plan. These soils are in the Cutthroat Seep range site.

These soils have severe limitations for urban uses because of wetness. Drainage outlets, tile drainage, or mounding are necessary if onsite sewage disposal systems are installed. Recreational development is also limited on these soils because of wetness and a sandy surface. Water control systems and suitable topsoil or resurfacing are ways of overcoming these limitations.

The soils in this map unit are in capability subclass IVw.

34—Tavares-Basinger-Sanibel complex, rolling. This complex consists of nearly level to rolling, moderately well drained soils on ridgetops and side slopes and poorly drained and very poorly drained soils in sloughs and depressional areas. The slopes are 2 to 12 percent in the upland areas and are less than 2 percent in the depressions and sloughs.

Tavares soil makes up most of this map unit and is on ridgetops and in the upland areas of the map unit. Sanibel soil dominates the depressional areas, and Basinger soil is in the sloughs and in some depressions. This map unit is only in the easternmost part of the ridge bounded on the south by the Seaboard Coast Railway and on the north by Arbuckle Creek Road.

Tavares soil makes up 60 percent of this map unit. Basinger soil makes up 20 percent, Sanibel soil makes up about 10 percent, and the included soils make up about 10 percent. The individual areas of these soils are too mixed or too small to map separately at the selected scale.

Tavares soil is moderately well drained. Typically, this soil has a surface layer of dark grayish brown sand about 6 inches thick. The underlying material to a depth of 80 inches or more is yellow and white sand. Mottles of brownish yellow sand are common at a depth of more than 50 inches.

Basinger soil is very poorly drained and poorly drained. Typically, this soil has a surface layer of dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish brown loamy fine sand.

Sanibel soil is very poorly drained. Typically, this soil has a surface layer of black muck about 8 inches thick. Below that layer, to a depth of 15 inches, is black mucky fine sand. The underlying material to a depth of 80 inches is gray and light brownish gray sand.

Included in mapping are small areas of Astatula, Myakka, Orsino, Pomello, and Satellite soils.

The available water capacity of Tavares soil is very low, and it is low in Basinger and Sanibel soils. The soils in this map unit are mostly rapidly permeable. Tavares soil has a seasonal high water table that is generally at a depth of 48 to 72 inches during the summer rainy season and other periods of high rainfall. During the summer rainy season, Sanibel soil is ponded and Basinger soil has a water table within 12 inches of the surface. Natural fertility is low in Tavares and

Basinger soils and moderate to high in Sanibel soils.

The natural vegetation on the Tavares soil consists of slash and longleaf pines, turkey oak, hickory, sand live oak, scattered saw palmetto, and pineland threeawn. The dominant vegetation on Basinger and Sanibel soils is maidencane, pickerelweed, arrowhead, redroot, and St. Johnswort.

Most of the soils in this map unit remain in natural vegetation but have been dissected by roads and ditches for an urban subdivision development. One large area has been planted to citrus crops. As the intended use of the land is for urban development, this would preclude its use for cultivated crops, improved pasture, or rangeland management.

The soils in this map unit have variable limitations for urban and recreational uses, depending upon the soil type, slope, and position on the landscape. The information provided is not intended to be used as site specific but only as general information. Each area considered for urban or recreational uses should be investigated to determine the proper soil limitations. Assistance can be obtained by contacting the Highlands Soil and Water Conservation District.

The parts of this map unit that are planted to citrus crops are in capability subclass IIIs.

35—Sanibel muck. This nearly level, very poorly drained soil is in marshes, swamps, and poorly defined drainageways. The mapped areas are irregular in shape and mostly range from 10 to 100 acres, but East of Lake Istokpoga are some mapped areas that are several hundred acres in size. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the organic surface layer is black muck about 8 inches thick. Below that layer, to a depth of 15 inches, is black mucky fine sand. The upper part of the underlying material, to a depth of 63 inches, is gray sand. The lower part to a depth of 80 inches or more is light brownish gray sand.

Included with this soil in mapping are small areas of Basinger, Kaliga, Placid, Samsula, and Tequesta soils. In places are soils that are similar to Sanibel soil, but they have a finer textured material in the substratum. In most areas, the included soils make up 15 to 30 percent of the map unit.

The available water capacity of this Sanibel soil is low. The permeability is rapid. Runoff is slow. Under natural conditions, the water table is above the surface for 2 to 6 months during the wet seasons. During the rest of the year, it is at a depth of less than 10 inches. Natural fertility is moderate, and the content of organic matter is high.

A large acreage of this soil has been cleared and drained for improved pasture. Many small areas remain in natural vegetation, which consists of cypress and other water-tolerant trees and pickerelweed, maidencane, and other water-tolerant grasses.

This Sanibel soil has very severe limitations for cultivated crops; however, if the soil is drained, a variety of crops can be grown. A properly designed water control system must be established and maintained. Lime is essential, and fertilizer should be added according to the need of the crops to obtain high yields.

With adequate drainage, this soil has very high potential for production of pasture and hay crops. Very high yields of pangolagrass, white clover, hermarthria, bahiagrass, and St. Augustine are possible with proper fertilization. Fertilizer that contains phosphates, potash, and trace elements is needed. Proper liming practices are also critical when establishing improved pastures. Water should be controlled to maintain the water table near the surface and prevent excess oxidation of the organic layer. Subsidence, or loss of the organic layer, is occurring in many improved pastures.

This soil is not suited to citrus or pine tree production. Citrus crops can be adapted if trees are planted in bedded rows and if proper drainage is established and maintained on the site.

The potential of this soil for producing significant amounts of desirable range plants is high. Maidencane and cutgrass are the most desirable plants. This soil can provide excellent forage for cattle during the winter and during dry periods. Marshes and swamps are some of the most productive areas for native rangeland in Highlands County. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for building sites, sanitary facilities, and recreational development. Extensive measures must be taken for most urban uses. Adequate drainage outlets are not available, and the cost of site improvement generally outweighs the benefits of urban development.

This Sanibel soil is in capability subclass IIIw.

36—Pomello sand, 0 to 5 percent slopes. This nearly level to gently sloping, moderately well drained soil is on slightly elevated ridges and knolls in the flatwoods part of the county and is also to a small extent in the ridge part of the county. The mapped areas are irregular in shape and mostly range from 10 to 30 acres. The slopes are generally smooth to convex.

Typically, the surface layer is dark gray sand about 4 inches thick. The subsurface layer, to a depth of 56

inches, is white sand. The upper part of the subsoil, to a depth of 62 inches, is mixed dark reddish brown and dark brown sand. The lower part to a depth of 80 inches or more grades to brown sand.

Included with this soil in mapping are small areas of Daytona, Duette, Immokalee, Orsino, and Satellite soils. In places are some small areas of soils along the Kissimmee River that are similar to Pomello soil, but they have brighter colors in the subsurface layer than Pomello soil and support hardwood hammock vegetation. In most areas, the included soils make up 10 to 15 percent of the map unit.

The available water capacity of this Pomello soil is very low. The permeability is moderately rapid. The water table is at a depth of 24 to 40 inches for 2 to 5 months. It is generally higher during the summer rainy season but may recede to a depth of more than 60 inches during the dry winter and other extended dry periods.

Areas of this soil have been cleared for improved pasture and citrus crops. Other areas are in natural vegetation of south Florida slash pine, longleaf pine, slash pine, sand live oak, Chapman oak, myrtle oak, fetterbush, saw palmetto, and scattered pineland threeawn.

This Pomello soil has severe limitations for cultivated crops because of droughtiness and rapid leaching of plant nutrients. If crops are grown, an irrigation system is needed during dry periods. Soil-improving measures should be implemented.

Citrus trees are moderately suited to this soil. A water control system should be established to remove excess water from the root zone. Because of the droughty characteristics of this soil, irrigation is needed to maximize yields and to reduce tree stress during dry periods.

The potential of this soil for production of pasture and hay crops is moderate. Bahiagrass and pangolagrass are best adapted to this soil. Regular applications of lime and fertilizer are needed. Grazing should be controlled to maintain healthy plants for maximum yields.

The potential of this soil for production of pine trees is low. Seedling mortality is the main concern in management. Slash, south Florida slash, and longleaf pines are the preferred trees for planting.

The potential of this soil for the production of range plants is very low. The plant community consists of a woody understory that is seldom grazed by livestock. This soil is in the Sand Pine Scrub range site.

This soil has moderate limitations for most urban uses because of the seasonal high water table. Most of these limitations can be easily overcome by simple water control systems, such as ditching, mounding, and installation of tile drainage. This soil is too sandy for most recreational uses. This limitation can be overcome by adding suitable topsoil or by resurfacing the area.

This Pomello soil is in capability subclass VIs.

37—Malabar sand, depressional. This nearly level, very poorly drained soil is in the concave areas on the flatwoods and along the edges of swamps and marshes. The mapped areas are irregular in shape and range from 10 to 50 acres. The slopes are smooth to concave and range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 5 inches thick. The subsurface layer, to a depth of 18 inches, is light gray sand. The upper part of the subsoil, to a depth of 48 inches, is brownish yellow and yellowish brown sand. The lower part, to a depth of 59 inches, is gray sandy loam. The substratum to a depth of more than 72 inches is light gray sand and loamy sand.

Included with this soil in mapping are small areas of Basinger, Felda, Hicoria, Placid, and Valkaria soils. In places are soils that are similar to Malabar soil, but they have thin layers of muck on the surface. In most areas, the included soils make up 20 to 30 percent of the map unit.

The available water capacity of this Malabar soil is low. The permeability is slow or very slow. This soil is ponded for 4 to 6 months each year. The water table is generally within 10 inches of the surface for the rest of the year. During long dry periods, it may recede to a depth of more than 30 inches.

Most of the acreage of this soil remains in natural vegetation, which consists of arrowhead, maidencane, pickerelweed, and St. Johnswort. A few areas are in water-tolerant trees.

This Malabar soil has very severe limitations for most cultivated crops because of ponding; however, a properly designed and managed water control system can overcome this limitation. The water control system should remove excess surface water after heavy periods of rainfall and provide internal drainage to the upper part of the soil profile. An adequate drainage outlet is needed for the system to function properly.

Citrus trees are not suited to this soil unless a water control system is established and maintained to regulate the water table. The trees should be planted in bedded rows.

Under natural conditions, this soil is not suited to improved pasture; however, if adequate measures are taken to remove the excess surface water and intensive

management is practiced, the potential of this soil for production of improved pasture grasses is moderate. White clover, bahiagrass, and pangolagrass are best adapted to this soil. A controlled grazing system should be used to maintain plant vigor. Regular applications of lime and fertilizer are needed.

This soil is not suited to pine trees because the water table is at or above the soil surface for most of the year.

The potential of this soil for the production of range plants is high. The dominant forage on this site is maidencane. Areas of this soil are not grazed during wet periods, and grazing is deferred until dry winter months when other range plants are of reduced quantity and value. This soil is in the Freshwater Marshes and Ponds range site.

This soil has severe limitations for all urban and recreational uses because of ponding. An effective drainage system that keeps the water table at a given depth is expensive and difficult to establish and maintain. This soil acts as a collection basin for the area; therefore, a suitable outlet to remove the water is not available. This soil requires an adequate amount of fill material to maintain house foundations and road beds above the high water table. Even when a good drainage system is installed and the proper amount of fill material is added, keeping the area dry is a continuing problem because of seepage water from the slightly higher adjacent flatwoods.

This Malabar soil is in capability subclass VIIw.

38—EauGallie fine sand. This nearly level, poorly drained soil is in the flatwood areas that are adjacent to sloughs and drainageways. The mapped areas are irregular in shape and range from 6 to 320 acres or more. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is very dark gray fine sand about 4 inches thick. The subsurface layer, to a depth of about 26 inches, is gray and light gray fine sand. The upper part of the subsoil, to a depth of about 40 inches, is black and dark reddish brown fine sand. The lower part to a depth of 80 inches is light brownish gray sandy clay loam and fine sandy loam.

Included with this soil in mapping are small areas of Felda, Immokalee, Myakka, Oldsmar, Pomona, and Smyrna soils. In places are soils that are similar to EauGallie soil, but they have a loamy layer within 40 inches of the surface. In most areas, the included soils make up 5 to 30 percent of the map unit.

The available water capacity of this EauGallie soil is low. The permeability is moderate to slow. The water table is within 12 inches of the surface during the summer rainy period. During the rest of the year, it is at a depth of 12 to 40 inches. A perched water table above the hardpan layer, or the upper subsoil, may be evident during periods of high rainfall.

Most areas of this soil are in native rangeland or improved pasture. The natural vegetation consists of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, running oak, pineland threeawn, and various species of bluestems, panicums, and other grasses.

This EauGallie soil has severe limitations for cultivated crops because of wetness. A water control system is needed to remove excess water during the rainy season and to provide irrigation in dry periods. With water control available, the soil is suitable for a variety of vegetable crops.

This soil is moderately well suited to citrus trees if a properly designed water control system is established and maintained. The system should keep the water table below a depth that is detrimental to the normal growth of the citrus trees. It should also provide supplemental irrigation during dry periods. Other management practices, such as bedding in rows, adequate drainage outlets, a cover crop to control erosion, proper fertilization, and adequate insect and disease control, are also needed.

The potential of this soil for production of pasture grasses is moderate. Pangolagrass, bahiagrass, and white clover grow well if properly managed. Installing a simple drainage system to remove excess surface water should be considered.

This soil has moderately high potential for production of pine trees. Seedling mortality and equipment limitations are the main management problems because of wetness. Slash and south Florida slash pine are the preferred trees for planting.

The potential of this soil for production of range plants is moderate. Significant amounts of creeping bluestem, chalky bluestem, indiangrass, and various panicums can be produced. Improper range management causes a decrease in these forage plants and increases the amount of undesirable plants, such as pineland threeawn, saw palmetto, and waxmyrtle. To avoid this, several range management practices, such as deferred grazing, brush control, and proper stocking, should be implemented. This soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of the high water table. To overcome this limitation, building sites and septic tank absorption fields should be mounded. This soil also has severe limitations for recreational development because of

wetness and the sandy texture. Problems associated with wetness can be corrected by providing adequate drainage and drainage outlets to control the high water table. The sandy texture limitation can be overcome by adding suitable topsoil or by resurfacing the area.

This EauGallie soil is in capability subclass IVw.

39—Smyrna sand. This nearly level, poorly drained soil is on the broad flatwoods in the county. The mapped areas are irregular in shape and range from 20 to 500 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is dark gray sand about 5 inches thick. The subsurface layer, to a depth of 15 inches, is light gray fine sand. The subsoil, to a depth of about 35 inches, is black, dark brown, and brown fine sand. The upper part of the substratum, to a depth of 45 inches, is light yellowish brown fine sand. The middle part, to a depth of 56 inches, is light gray fine sand. The lower part to a depth of 80 inches is white sand.

Included with this soil in mapping are small areas of Basinger, Immokalee, Myakka, Placid, and Valkaria soils. In most areas, the included soils make up 10 to 20 percent of the map unit.

The available water capacity of this Smyrna soil is low. The permeability is moderate or moderately rapid. The water table is at a depth of less than 12 inches during the summer rainy season. Generally, during the rest of the year, it is at a depth of 12 to 40 inches. During extended dry periods, the water table can recede to a lower depth. Also, this soil can have a perched water table because of the permeability of the subsoil.

Many areas of this soil have been cleared for improved pasture. The acreage that remains in natural vegetation consists mainly of slash pine, south Florida slash pine, longleaf pine, saw palmetto, gallberry, fetterbush, waxmyrtle, and running oak. Pineland threeawn is the dominant grass; but depending on range conditions, there are significant amounts of creeping bluestem, lopsided indiangrass, panicum, and other grasses.

This Smyrna soil has severe limitations for cultivated crops because of wetness. With proper management, this soil is well suited to a variety of vegetable crops. A properly designed water control system should be established and maintained to remove excess surface water during rainy periods and to provide irrigation during dry periods. Proper measures include bedding in rows and regular applications of lime and fertilizer. Crop residue and soil-improving crops should be left on the surface to help control erosion.

Citrus trees are moderately well suited to this soil if a properly designed water control system is established and maintained. The system should be designed to maintain the water table at an effective depth. Irrigation water should be available during dry periods. Regular applications of fertilizer and lime are needed.

The potential of this soil for production of pasture and hay crops is moderate. Bahiagrass, pangolagrass, and white clover are best suited to this soil. Surface drainage is needed to remove excess surface water after periods of heavy rainfall. Regular applications of lime and fertilizer are needed. Grazing should be controlled to prevent overgrazing and weakening of plants.

The potential of this soil for production of pine trees is moderately high. Equipment use limitations, seedling mortality, and plant competition are concerns in management. Trees should be planted in bedded rows. Slash and south Florida slash pine are the preferred trees for planting.

The potential of this soil for the production of range plants is moderate. This soil has the potential for producing significant amounts of creeping bluestem, chalky bluestem, indiangrass, various panicums, and numerous legumes and forbs. Grazing should be controlled to maintain plant vigor; if not, the range will deteriorate and pineland threeawn and saw palmetto will dominate the site. Proper management should include consideration of grazing time and number of cattle per acre. This Smyrna soil is in the South Florida Flatwoods range site.

This soil has severe limitations for most urban uses because of the high water table. To overcome these limitations, building sites and septic tank absorption fields should be mounded. This soil also has severe limitations for recreational development because of wetness and the sandy texture. Problems associated with wetness can be corrected by providing adequate drainage systems and drainage outlets to control the high water table. The sandy texture limitation can be overcome by adding suitable topsoil or by resurfacing the area.

This Smyrna soil is in capability subclass IVw.

40—Arents, organic substratum. Arents consists of soil materials that have been dug from different areas in the county and have been spread over the muck soils for urban area development. The slopes are less than 2 percent.

In most places, this soil is made up of loose, sandy, mineral material. In some places, varying amounts of

loamy material or former subsoils that are made up of organic matter coated sand grains are mixed throughout or occur as pockets, lenses, and streaks. Depth of this fill material varies from 20 to more than 80 inches. Muck of variable thickness underlies the fill material, and mineral material is below the muck.

Included with this soil in mapping are small areas of Basinger and Placid soils. In places are areas of soils that have less than 20 inches of fill material over the muck. In most areas, the included soils make up 5 to 10 percent of the map unit.

The available water capacity of this soil and the permeability are variable depending on the composition of the fill material. The water table is variable and can be at a depth of 10 to more than 80 inches depending on the amount of fill material that has been added and also depending on whether the area has been drained or not drained.

This soil is not used for cultivated crops, citrus crops, pasture, pine trees, or native rangeland.

This soil has varied limitations for urban and recreational development depending on the type of fill material and the thickness of the material. The original water table should be maintained so that the muck does not dry out, causing it to oxidize and then subside. This subsidence will cause roads and foundations to settle and crack. Lawns, gardens, and ornamental plants can be grown successfully, but the pH of the soil should be checked because of the high variability of the fill material. An onsite soils investigation is needed on each individual site.

This Arents soil is not assigned to a capability subclass.

41—Anclote-Basinger fine sands, frequently flooded. This complex consists of nearly level, very poorly drained and poorly drained soils. The mapped areas are long and narrow and are adjacent to streambeds. These areas are dissected by stream action. The slopes are dominantly 0 to 2 percent, but stream dissection has created many short, steep slopes.

Anclote soil makes up 45 to 60 percent of this complex. Basinger soil makes up 25 to 35 percent. The included soils make up 5 to 30 percent. The individual areas of the soils in this map unit are too mixed or too small to map separately at the selected scale.

Anclote soil is very poorly drained. Typically, the surface layer is very dark gray fine sand about 20 inches thick. The underlying material to a depth of 80 inches or more is dark gray and light brownish gray fine sand.

Basinger soil is poorly drained. Typically, the surface layer is dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of about 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches or more is grayish brown loamy fine sand.

Included with these soils in mapping are small areas of Hicoria, Hontoon, and Samsula soils. Hontoon and Samsula soils are in old isolated meanders. In places are soils that have a darker, finer textured surface layer and have a loamy substratum.

The available water capacity of the soils in this map unit is low. The permeability of these soils is somewhat variable, but in most places, it is rapidly permeable.

Depth to the high water table at any particular site depends on elevation above stream bottom. Rainfall over the watershed causes frequent flooding. Generally, this soil is flooded every year, and every 2 years on the average it is flooded more than once during the year. The flooding results in yearly deposition and scouring of the surface. Debris is on the surface, and floodwater marks are evident on trees, fences and bridges. The water table depth will fluctuate depending on streamflow. During periods of flooding, soils near the stream are saturated. During dry periods, the stream provides drainage of the soils. This drainage lowers the water table. The soils will be dryer and have less water available for plant growth.

The natural vegetation consists of dense stands of baldcypress, red maple, blackgum, bays, and other water-tolerant trees and ferns and other water-tolerant plants.

This soil is not suited to cultivated crops, citrus crops, pastures, pine trees, native rangeland, or urban use because of the hazard of flooding.

The soils in this complex are in capability subclass VIw.

42—Astatula-Urban land complex, 0 to 8 percent slopes. This complex consists of nearly level to moderately sloping, excessively drained Astatula soil and areas of Urban land (fig. 5). Astatula soil is on broad, upland ridges and in unoccupied areas, such as lawns and vacant lots, of the Urban land part of the complex.

Astatula soil or Astatula soil that has been modified by cutting, grading, or shaping makes up 40 to 70 percent of this map unit. In a few small areas, Urban land makes up 70 percent of the map unit. In most areas, Urban land makes up 15 to 40 percent. The

Figure 5.—Urban development and citrus crops are competing land uses on Astatula soil in this area of Astatula-Urban land complex, 0 to 8 percent slopes.

included soils make up 20 to 50 percent of the map unit. The individual areas of Astatula soil and of Urban land are too mixed or too small to map separately at the selected scale.

Typically, Astatula soil has a surface layer of dark grayish brown sand about 8 inches thick. The underlying material to a depth of 80 inches is brownish yellow sand.

The Urban land part of this map unit is covered by roads, houses, driveways, and other urban structures.

Included in mapping are small areas of Archbold, Daytona, Duette, Orsino, Paola, St. Lucie, and Tavares soils.

The available water capacity of this Astatula soil is very low. The permeability is very rapid. The water table is at a depth of more than 72 inches.

Present land use precludes the use of this map unit for cultivated crops, citrus crops, improved pasture, rangeland, or pine trees. The potential of these soils in existing open spaces is high for most urban uses; however, lawns, gardens, and ornamentals will require supplemental irrigation and fertilization because of the droughty nature of these soils and their low natural fertility. If the surface soil has been removed, additions of a good quality topsoil may be needed for vigorous plant growth.

The soils in this map unit have not been assigned to a capability subclass.

43—Urban land. Urban land consists of areas that are 75 percent or more covered with streets, buildings, parking lots, shopping centers, industrial areas, airports, and other urban structures. Small areas of undisturbed soils are mostly in lawns, vacant lots, playgrounds, and green areas. The original soil in some areas has been altered by filling, grading, and shaping. Urban land is nearly level except for some parking areas that are sloped to drain off water. The mapped areas range from about 5 to 100 acres. The slopes range from 0 to 2 percent.

Included in mapping are Archbold, Astatula, Satellite, and Tavares soils. These areas are too small to delineate separately.

Urban land will remain in its present use; therefore, no other uses are rated.

Urban land has not been assigned a capability subclass.

44—Satellite-Basinger-Urban land complex. This complex consists of nearly level, somewhat poorly drained Satellite soil and poorly drained Basinger soil and areas of Urban land. The slopes range from 0 to 2 percent.

This map unit consists of about 20 to 60 percent Satellite soil, 5 to 25 percent Basinger soil, and 15 to 55 percent Urban land. In a few small areas, Urban land makes up more than 55 percent of the map unit. The individual areas of the soils in this map unit are too mixed or too small to map separately at the selected scale.

Typically, Satellite soil has a surface layer of dark gray sand about 4 inches thick. The subsoil to a depth of more than 80 inches is white fine sand.

Typically, Basinger soil has a surface layer of dark gray fine sand about 6 inches thick. The subsurface layer, to a depth of about 21 inches, is light gray and light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of 80 inches is grayish loamy fine sand.

The Urban land part of this complex consists of housing developments, recreational areas, shopping centers and other urban structures. Openland areas are mainly lawns, playgrounds, and vacant lots.

Included in mapping are small areas of Archbold, Immokalee, Myakka, and Placid soils.

The available water capacity of this Satellite soil is very low. The permeability is very rapid. The water table is at a depth of 12 to 40 inches for periods of 2 to 6 months.

The available water capacity of this Basinger soil is very low. The permeability is rapid. The water table is within 12 inches of the surface for 2 to 5 months during the summer rainy season. Generally, the water table is between depths of 12 and 40 inches for 6 months or more but may recede to a lower depth during extended dry periods.

Present land use precludes the use of these soils for cultivated crops, citrus crops, pasture, or commercial woodland. The open part of the map unit is used for lawns, gardens, ornamentals, and open space. For maintaining lawns and plants in good condition, regular applications of fertilizer and supplemental irrigation are needed. A water control system is necessary to remove excess surface water from Basinger soil during periods of high rainfall. Because of the complexity of these areas and severe water problems affecting the urban uses of these soils, it is suggested that a site specific investigation be conducted to determine suitability for the intended use. Assistance in conducting this investigation can be obtained by contacting the Highlands Soil and Water Conservation District.

The soils in this map unit have not been assigned to a capability subclass.

45—Paola-Basinger sands, rolling. This highly pitted complex consists of nearly level to rolling, excessively drained soils on side slopes and ridgetops and poorly drained to very poorly drained soils in small depressional areas. The slopes are smooth to convex on the ridges and concave in the depressions and range from 0 to 12 percent. Basinger soil ranges from less than 1 acre to more than 10 acres, and Paola soil makes up the remaining acres in the map unit. This map unit is only in one area on the southeastern side of the ridge between Lake Placid and Florida State Highway 70.

Paola soil makes up 60 to 75 percent of this map unit. Basinger soil makes up 5 to 20 percent. The included soils make up 5 to 35 percent. The individual areas are too mixed or too small to map separately at the selected scale.

Paola soil has slopes of 2 to 12 percent. Typically, this soil has a surface layer of gray sand about 7 inches thick. The subsurface layer, to a depth of 17 inches, is light gray sand. The subsoil, to a depth of 27 inches, is very pale brown sand. The substratum to a depth more than 80 inches is yellowish brown and yellow sand.

Basinger soil is in the pitted or depressional areas. Typically, the surface layer of this soil is dark gray fine sand about 6 inches thick. The upper part of the subsurface, to a depth of 16 inches, is light gray fine

sand. The lower part, to a depth of 21 inches, is light brownish gray fine sand. The subsoil, to a depth of 52 inches, is brown fine sand. The upper part of the substratum, to a depth of 62 inches, is light brownish gray fine sand. The lower part to a depth of more than 80 inches is grayish brown loamy fine sand.

Included in mapping are Astatula, Myakka, Orsino, Placid, St. Lucie, and Satellite soils. Placid soil makes up about 30 percent of the part described as Basinger soil. In places are soils in areas that are ponded throughout the year and soils in areas that have 12 to 20 percent slopes. Most of this map unit is in an urban subdivision; consequently, many areas have been altered by cutting, filling, or smoothing for present and future development.

The available water capacity of Paola soil is very low. The permeability is very rapid. The water table is at a depth of more than 72 inches throughout the year.

The available water capacity of Basinger soil is low. The permeability is rapid. The water table is at a depth of less than 12 inches during the summer rainy season. Some areas are ponded for a short period after heavy rainfall. The high water table impedes internal drainage.

The natural vegetation on Paola soil consists of sand and slash pines, turkey oak, myrtle oak, Chapman oak, sand live oak, pignut hickory, scattered saw palmetto, and pineland threeawn. The natural vegetation on the Basinger soil is mostly St. Johnswort and some pineland threeawn, sand cordgrass, cutgrass, bluestem, maidencane, and pickerelweed.

The present and intended use as an urban subdivision precludes the use of this land for cultivated crops, citrus crops, improved pasture, pine tree production, or rangeland. The soils in this map unit have varied limitations for urban and recreational uses, depending on the slope and position on the landscape. This information is not site specific; therefore, an onsite investigation of each area is needed to determine the limitations for the intended use. Assistance can be obtained by contacting the Highlands Soil and Water Conservation District.

Wetness in the depressions is the main limitation for urban uses. This problem can be overcome by adding fill material since most areas are small. Septic tank absorption fields on slopes can cause seepage downslope or possible contamination of well water. Lawns and gardens will require supplemental irrigation. Shoring is needed in shallow excavations in these sandy soils.

The soils in this map unit have not been assigned to a capability subclass.

46—Kaliga muck, frequently flooded. This nearly level, very poorly drained soil is on a long, narrow flood plain that is adjacent to the streambed on Arbuckle Creek. The mapped areas range from 25 to more than 100 acres. The slopes are smooth and range from 0 to 2 percent.

Typically, the surface layer is black muck about 6 inches thick. Below that layer, to a depth of 39 inches, is dark brown muck. The upper part of the underlying material, to a depth of 45 inches, is a thin layer of grayish brown very fine sand. The next layer, to a depth of 68 inches, is dark gray very fine sandy loam. The lower part to a depth of 80 inches is grayish brown very fine sand.

Included with this soil in mapping are small areas of Basinger, Felda, Hicoria, Samsula, Sanibel, and Tequesta soils. In most areas, the included soils make up 15 to 35 percent of the map unit.

The available water capacity of this Kaliga soil is very high. The permeability is slow or very slow. The seasonal high water table is at a depth of less than 12 inches for very long periods in most years. These soils are subject to flooding for long periods during seasons of high rainfall. The flooding results in deposition and removal of sediment and debris. In the lowest areas on the flood plain, the muck is generally thicker. On higher bars, the soils have a thick, sandy surface layer stratified with buried organic material. On the more sloughlike areas on the landscape, the soils have a thin, organic layer underlain by sand.

The natural vegetation consists of maidencane, duckpotato, arrowhead, pickerelweed, and waxmyrtle and buttonbush, bays, red maple, blackgum, and cypress trees.

Under natural conditions, this Kaliga soil is not suited to cultivated crops, citrus crops, pasture, or woodland because of the hazard of flooding.

In some areas of this map unit, the potential of this soil for producing significant amounts of improved pasture grasses is very high. Water control systems should be designed to remove excess surface water and to provide flood control measures.

The potential of this soil for producing significant amounts of desirable range plants is high. Maidencane and cutgrass are the most desirable plants. Many areas of this soil provide little or no vegetation that cattle find desirable. Those areas that do produce desirable plants provide excellent forage during the normally dry months when the native rangeland is depleted. Marshes and swamps are beneficial in a good range management program. This soil is in the Freshwater Marshes and Ponds range site.

This soil is very poorly suited to urban or recreational development because of flooding, wetness, and low soil strength. Overcoming these hazards and limitations are expensive and impractical.

This Kaliga soil is in capability subclass VIIw.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavior characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis for predicting soil behavior.

This section can be used to plan the use and management of soils for crops, pasture, rangeland, and woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with nature.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where wetness or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

Larry Sharpe, district conservationist, and Thomas Edward Sievers, range conservationist, Soil Conservation Service, helped to prepare this section.

General management needed for crops and pasture is suggested in this section. The crops or pasture plants best suited to the soils, including some not commonly grown in the survey area, are identified; the system of land capability classification used by the Soil Conservation Service is explained; and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Soil Conservation Service or the Cooperative Extension Service.

About 271,000 acres in Highlands County is used for pasture and crops according to estimates from Florida Crop and Livestock Reporting Service *(7)*. Of this total, 220,000 acres is used for pasture; more than 46,000 acres for citrus crops; and 5,000 acres for specialty crops. The main specialty crops are cucumbers, watermelons, tomatoes, caladiums, sod, and nursery plants.

Pasture

Pasture plants are commonly referred to as improved, which denotes that they are mostly introduced species, are adapted to the climate, and often provide improved forage quality.

Warm-season perennial grasses are the most dominant introduced forage in Highlands County. These grasses produce most of their growth in the summer. Bahiagrass (fig. 6) is the most common grass in the county. The scarcity of digitgrass, limpograss, and bermudagrass is attributed to their need for more intensive management. Annual grasses include ryegrass, a cool-season forage, and sorghum-sudangrass hybrids, a warm-season forage. Grass pastures can be supplemented with legumes to increase forage production, palatability, and digestibility. Legumes also fix atmospheric nitrogen, which supplies additional nitrogen to the grass. This reduces or eliminates the need for nitrogen fertilization. White

Figure 6.—This improved pasture of bahiagrass on Oldsmar fine sand offers good grazing for the cattle.

clover is the major cool-season legume. Warm-season legumes include perennials, such as carpon desmodium and phasey bean, and annuals, such as aeschynomene, hairy indigo, and alyce clover.

Some introduced plants are not adapted to Florida's natural environment; consequently, the environment must be modified to compensate for the introduced plants' shortcomings and to insure their survival and optimum performance. Environmental modifications include water control, such as drainage and irrigation, and soil amendments, such as fertilization and pH adjustment. Rotation grazing is needed to provide adequate rest periods during the growing season for the forage to reproduce and replenish root reserves. This periodic rest period insures a healthy, productive, and nutritious forage.

The prevalence of weeds and brush indicates the need for improved management. In addition, other common problems are excessive or inadequate moisture, low fertility or pH, uncontrolled grazing, or improper plants selection.

Pasture is used to produce forage for beef and dairy cattle. Commercial cow-calf operations are the major livestock enterprises. These beef-cattle operations range from several hundred animals to a hundred animals or less. Large operations generally depend upon a combination of rangeland and improved, or introduced, perennial plants for forage, while the small

operations generally use only improved pasture plants.

In recent years, the higher cost of fertilizer and equipment has slowed the conversion of rangeland to pastureland. Some Florida ranchers, aware of the value of the native grasses, have moved from the intensive agronomic management approach to a more ecologically-based management of native grasses.

Pomello and Tavares soils are moderately suited to bahiagrass, improved bermudagrass, and pangolagrass. With good management, hairy indigo, alsike clover, and aeschynomene can be grown in summer and fall. Satellite soil is moderately suited to bahiagrass, improved bermudagrass, and legumes, such as sweet clover, but adequate amounts of lime and fertilizer must be applied.

If drained, Basinger, Bradenton, EauGallie, Felda, Immokalee, Malabar, Myakka, Oldsmar, Pineda, Smyrna, and Valkaria soils are well suited to pastures of bahiagrass and hermarthria grass. Subsurface irrigation increases the length of the growing season and the total forage production. Legumes, such as white clover, are well suited to these soils if adequate amounts of lime and fertilizer are added.

The very poorly drained soils, such as Anclote, Chobee, Gator, Hicoria, Placid, and Samsula soils, are very wet during rainy periods. In most areas, water stands on the surface, and the production of pasture of good quality is not possible unless artificial drainage is used.

The design of surface drainage and subsurface irrigation systems varies with the kind of soil and the forage species. For intensive pasture production, a combination of these systems is needed. Information on the drainage and irrigation needed for each kind of soil is available at the local office of the Soil Conservation Service.

In some parts of the county, pasture is greatly depleted by excessive grazing. Yields of pasture are increased mainly by good grassland management and by adding lime and fertilizer. Differences in the amount and kind of pasture yields are closely related to the kind of soil. Management of pasture is based on the relationship of soils, pasture plants, lime, fertilizer, moisture, and management.

The latest information about pasture can be obtained from local offices of the Soil Conservation Service and the Cooperative Extension Service.

Crops

The major crop in Highlands County is citrus. Other crops are vegetables and specialty crops.

Most of the soils used for crops in Highlands County have a sandy surface layer that is low to moderate in content of organic matter. The exceptions are Anclote, Brighton, Chobee, Gator, Hicoria, Hontoon, Placid, Samsula, Sanibel, and Tequesta soils. Anclote, Chobee, Hicoria, and Placid soils have a sandy, dark surface layer that is high in content of organic matter. Brighton, Gator, Hontoon, Tequesta, Sanibel, and Samsula soils are organic soils and have an organic surface layer. Generally, the structure of the surface layer of most soils in the county is weak. Most of the moderately well drained soils and the somewhat poorly drained Satellite soils are low in content of organic matter and are droughty. Returning crop residue to the soil and planting cover crops will improve soil structure and increase the available water capacity of the soil.

If irrigated, Astatula, Paola, and Tavares soils are very well suited to citrus crops. If adequately drained, Basinger, Bradenton, EauGallie, Felda, Immokalee, Malabar, Myakka, Oldsmar, Pineda, Smyrna, and Valkaria soils are well suited to vegetable crops and citrus crops. Soils in low areas where air drainage is poor and frost pockets are common, generally are poorly suited to early vegetables, small fruits, and citrus crops.

Field crops are grown on a small acreage in Highlands County. The acreage of corn, grain sorghum, sunflowers, and sugarcane can be increased if economic conditions warrant. Rye is the common close-growing crop.

The specialty crops that are grown commercially are citrus, watermelons, tomatoes, cucumbers, caladiums, nursery plants, and sod. If economic conditions are favorable, the acreage of nursery plants and sod can be increased.

The latest information for growing specialty crops can be obtained from the local office of the Cooperative Extension Service or the Soil Conservation Service.

Soil erosion by water is not a serious problem in Highlands County. Erosion generally is a hazard on the more sloping soils if the surface is not protected by a cover of vegetation. Loss of the surface layer through erosion is damaging because productivity is reduced as the surface layer is lost and part of the subsoil is incorporated into the plow layer. This loss is damaging also because soil erosion on farmland results in sedimentation of streams. Controlling erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Erosion control practices provide protective surface cover, reduce runoff, and increase infiltration. A cropping system that keeps a vegetation cover on the

soil for extended periods can hold soil losses to an amount that will not reduce the productive capacity of the soils. On livestock farms, which require pasture and hay, the legumes and grass forage crops in the cropping system reduce erosion on sloping soils, provide nitrogen, and improve tilth for the following crop.

Tillage practices that leave crop residue on the surface reduce runoff and help control erosion. These management practices can be adapted to most soils in the county.

Wind erosion is a major hazard on the sandy soils and on the organic soils. In a few hours, wind can damage soils and tender crops in open, unprotected areas if it is strong and the soil is dry and bare of vegetation or crop residue. About three-fourths of the cropland is subject to wind erosion. Keeping a plant cover or mulch on the surface reduces wind erosion.

Wind erosion is damaging for several reasons. It reduces soil fertility by removing the finer soil particles and organic matter from the soil; damages or destroys crops by sandblasting; spreads diseases, insects, and weed seeds; and creates health hazards and cleaning problems. Control of wind erosion maintains soil quality, protects crops, reduces the spread of insects and disease, and improves air quality.

Field windbreaks of adapted trees and shrubs, such as Carolina cherry laurel, slash pine, southern redcedar, and Japanese privet and strips of small grains, are effective in reducing wind erosion and crop damage. Field windbreaks and strip crops are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The intervals depend on the erodibility of the soil and the susceptibility of the crop to damage from sandblasting.

Information about conservation practices to control erosion on each kind of soil in the county and on the design of wind erosion control systems is available from the local office of the Soil Conservation Service.

Soil drainage is a major concern in management on much of the acreage used for crops in the county. Some soils, such as the poorly drained Basinger, Bradenton, EauGallie, Felda, Immokalee, Malabar, Myakka, Pineda, Smyrna, and Valkaria soils, are naturally so wet that the production of crops commonly grown in the area is generally not practical.

During wet periods in most years, excessive wetness of the root zone causes damage to citrus crops on the somewhat poorly drained soils unless the soils are artificially drained. Examples are Pomello and Satellite soils.

Soil fertility is naturally low in most soils in the county. Most of the soils have a sandy surface layer and are a light color. Bradenton, Felda, Malabar, and Pineda soils have a loamy subsoil. Anclote, Astatula, Satellite, Tavares, and Valkaria soils have sandy material to a depth of 80 inches or more. Basinger, EauGallie, Immokalee, Myakka, Pomello, and Smyrna soils have a dark sandy subsoil that contains organic carbon.

Most of the soils have a surface layer that is strongly acid or very strongly acid. Applications of ground limestone are required to raise the pH level sufficiently for good growth of crops. The levels of nitrogen, potassium, and available phosphorus are naturally low in most soils in Highlands County. On all soils, additions of lime and fertilizer should be based on the results of soil tests, on the need of the crops, and on the expected yields. The Cooperative Extension Service can help in determining the kind and amount of fertilizer and lime to apply.

Soil tilth is an important factor in the germination of seeds and in the infiltration of water into the soil. Soils that have good tilth are granular and porous.

Yields Per Acre

The average yields per acre that can be expected of the principal crops under a high level of management are shown in table 3. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the various crops depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green manure crops; and harvesting that insures the smallest possible loss. For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

The estimated yields reflect the productive capacity

of each soil for each of the principal crops. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops other than those shown in table 3 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Soil Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for use as cropland. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major, and generally expensive, landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils are generally grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows, but in this survey, there are no Class I, II, V, or VIII soils.

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode, but they have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *w,* or *s,* to the class numeral, for example, IIIw. The letter *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); and *s* shows that the soil is limited mainly because it is shallow, droughty, or stony.

The acreage of soils in each capability class and subclass is shown in table 4. The capability classification of each map unit is given in the section "Detailed Soil Map Units."

Rangeland

Thomas Edward Sievers, range conservationist, Soil Conservation Service, assisted in preparing this section.

Rangeland is land on which the natural vegetation is predominantly native grasses, grasslike plants, forbs, or shrubs suitable for grazing by domestic livestock or wildlife. In addition to livestock forage and wildlife habitat, rangeland provides wood, water, recreation, and scenic beauty. Rangeland includes grassland, open forest, wetland, and shrubland.

Rangeland was once more prevalent throughout Highlands County, and numerous ranching enterprises prospered from the abundant native forage. Common grazing practices that were previously used unwittingly lead to the degradation of rangeland productivity. The obvious solution was the conversion of rangeland into pastureland of introduced or nonindigenous grasses and legumes. Rangeland now covers 269,243 acres of the county *(14)*.

Rangeland differs in the species composition and production potential. Distinctive types of rangeland are called range sites. These sites are differentiated by the various soil types, particularly their topographic position on the landscape and their associated drainage regimes. A characteristic "climax plant community" has evolved under the natural conditions of each range site. These plant associations are best suited to the existing environmental condition of the site. Certain species in the climax plant community are better adapted than other species. These better adapted species compete more effectively for light, water, and nutrients; therefore,

they tend to dominate the climax plant community. Less adapted species are only minor components. Human activities that drastically deviate from the natural precedence, such as excesses of grazing, burning, or drainage, will alter the balance between plant species and will change the complexion of each range site impacted.

Native plants can be divided into three groups based on their response to continual heavy grazing—decreasers, increasers, and invaders.

Decreasers are the most palatable plants; consequently, they are the first to decline under continual heavy grazing. Decreasers are generally the best adapted and most productive species.

Increasers are less palatable to livestock. They increase initially as the decreasers are eliminated, but they also eventually decrease.

Invaders have very little forage value so they tend to increase and become more dominant plants as the decreaser and increaser plants are grazed out.

Rangeland dominated by climax vegetation, predominantly decreasers and a few increasers and invaders, are in excellent condition. Rangeland in poor condition is dominated by increasers and invaders, and decreasers are rare. Two additional condition classes, good and fair, describe rangeland of intermediate condition.

Grazing can be controlled to protect and promote the climax plant community. Such management will enhance forage production and palatability, soil and water conservation, and wildlife habitat. Adequate rest periods, where grazing is prohibited, are essential if decreasers are to remain healthy and vigorous. Plants need the opportunity to replenish root reserves and produce seed. Young plants need time to establish themselves. These rest periods are needed during the growing season, following grazing, and after burning and brush control practices have been applied. Livestock should consume 50 percent or less of the plant, by weight. The remaining part of the plant is enough to initiate regrowth without depleting root reserves. Rotational grazing provides a mechanism to enable rest periods and proper utilization.

Mechanical brush control treatments, such as roller chopping and webb plowing, accelerate range recovery from lower to higher condition classes if used in conjunction with rotational grazing. The elimination of shrubs releases the decreasers from persistent competition, and the soil disturbance of mechanical treatments enhances tillering and reseeding of many decreaser species. Florida rangelands evolved with periodic wildfires. Prescribed burning keeps shrubs suppressed, removes rank forage, returns nutrients to the soil, and reduces the hazard of wildfire. Excessive burning more frequently than every third year can be detrimental to climax plant communities.

Range Sites

The soils in Highlands County have been grouped into seven range sites. The following descriptions of each range site gives important soil characteristics, production potential, species composition, and specific concerns of management.

South Florida Flatwoods.—This range site consists of nearly level, poorly drained, coarse textured soils. Many of these soils have organic pans. The water table fluctuates during the year and may rise to the surface during the rainy season. The common flatwoods soils are Myakka and Immokalee soils. The flatwoods are Highlands County's most common range site and are easily recognized by the open stands of longleaf or slash pines and the saw palmetto understory. Creeping bluestem is a key decreaser species. Chalky bluestem, lopsided indiangrass, and blue maidencane are other important decreaser grasses. Important forbs include grassleaf goldaster, gayfeather, deertongue, and other perennial legumes. Wiregrass, saw palmetto, and gallberry are the most common invaders. Flatwoods in excellent condition will produce about 4,500 pounds of air-dried herbage per year. Flatwoods in poor condition produce 1,500 pounds per acre, per year.

Traditionally, flatwoods have been winter burned and grazed thereafter. Burning was necessary to improve the palatability of wiregrass (pineland threeawn), which dominates flatwoods in poor condition. Wiregrass becomes unpalatable again in the spring, but the decreaser grasses remain palatable; therefore, wiregrass receives a rest the remainder of the growing season, but the few decreasers that remain are subjected to heavy and continuous use. Flatwoods in poor condition should be grazed for shorter periods following burning to utilize wiregrass production and should be rested the remainder of the growing season to encourage the decreasers. Flatwoods in good and excellent condition generally need to be rested after burning. Decreaser plants are less fire resistant and need time to recover. Flatwoods make good winter range because the bluestems remain green and shrubs are available for grazing and cover.

Freshwater Marshes and Ponds.—This range site is on low-lying, nearly level, and very poorly drained soils. These soils are inundated for most of the growing season. Some soils, such as Kaliga, Samsula, and Brighton soils, are organic. Others, such as Hicoria and

Placid fine sand, depressional, soils, are mineral. Maidencane and cutgrass are the most important decreasers. Sand cordgrass and carpetgrass are common invaders. Marshes in excellent condition can produce 10,000 pounds per acre of palatable range forage per year. Marshes in poor condition produce about 2,000 pounds per acre of herbage per year.

Freshwater marshes and ponds are the most productive range sites in Highlands County. Maidencane and cutgrass grown on organic soils are superior in quality and quantity to other native grasses; however, the inundation and softness of organic soils can limit summer grazing. Maidencane and cutgrass are prone to die back following freezing temperatures; consequently, spring and fall provide the best grazing opportunities.

Slough.—This range site is on nearly level, poorly drained, coarse textured soils. Basinger is the most common slough soil. Topographically, sloughs are positioned between the flatwoods and marshes. Sloughs serve as drainageways through the flatwoods that often connect and ring the marshes. Blue maidencane is the major decreaser grass. Toothachegrass and hairy bluestem are other important decreaser grasses. Wiregrass, St. Johnswort, waxmyrtle, sedges, and rushes are the most common invaders. Sloughs in excellent condition produce an average of 6,000 pounds per acre, per year. Sloughs in poor condition produce much less forage, and the quality is poorer. Blue maidencane is prone to die back after freezing temperatures or in late fall. Excessive drainage, combined with uncontrolled grazing, has encouraged shrub encroachment, particularly waxmyrtle.

Sand Pine Scrub.—This range site is on high, moderately well drained to excessively drained, coarse textured soils. Ridge soils, such as Paola, St. Lucie, Duette, and Daytona soils, support this range site. Sand pine is the characteristic species of these droughty soils. The understory is dominated by shrubs, including rosemary, scrub hickory, and sand live oak; consequently, forage production is low. Lopsided indiangrass, creeping bluestem, and shortspike bluestem are decreaser grasses.

Longleaf Pine-Turkey Oak Hills.—This range site is on nearly level to steep, moderately well drained to excessively well drained, coarse textured soils. Ridge soils, such as Astatula and Tavares soils, support this range site. The overstory is composed of longleaf pine and turkey oak. Creeping bluestem, lopsided indiangrass, and switchgrass are the major decreaser grasses. Wiregrass and saw palmetto are the common invaders. This range site in excellent condition will produce about 3,000 pounds of herbage per acre, per year. Most of the Longleaf Pine-Turkey Oak Hills range sites have been converted to citrus crops or urban development use.

Cutthroat Seep.—This range site is on nearly level, poorly drained and very poorly drained soils in seep areas. Cutthroat seeps are situated below the Sand Pine Scrub and the Longleaf Pine-Turkey Oak Hills range sites and above the flatwoods. Longleaf or slash pines dominate the overstory. Creeping bluestem, chalky bluestem, and toothachegrass are the major decreaser grasses. Cutthroat grass is the dominant increaser grass. Cutthroat seeps in excellent condition will produce about 7,500 pounds per acre, per year of forage. Cutthroat Seeps provide good winter grazing because cutthroat grass and the bluestems remain green for grazing and cover.

Wetland Hardwood Hammock.—This range site is on a poorly drained, coarse textured, calcareous soil, namely Bradenton. The density of hardwoods and cabbage palm overstory can limit forage production on this site. Other tree species include live oak, laurel oak, red maple, and blackgum. Longleaf uniola, switchgrass, and eastern gamagrass are the major decreaser grasses.

Table 5 shows, for each soil, the range site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in table 5 follows.

A *range site* is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, or proportion of range plants. The relationship between soils and vegetation was established during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important.

Total production is the amount of vegetation that can be expected to grow annually on well managed rangeland that is supporting the climax plant community. Total production includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruits of woody plants, but it does not include the increase in stem diameter of trees and shrubs. It is

expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation—the grasses, forbs, and shrubs that make up most of the climax plant community on each soil—is listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range management requires a knowledge of the kinds of soil and of the potential climax plant community. It also requires an evaluation of the present range condition. Range condition is determined by comparing the present plant community with the potential climax plant community on a particular range site. The more closely the existing community resembles the climax community, the better the range condition. Range condition is an ecological rating only. It does not have a specific meaning that pertains to the present plant community in a given use.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the climax plant community for that site. Such management generally results in the optimum production of vegetation, reduction of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Woodland Management and Productivity

Paul F. Ebersbach and Kurt E. Olsen, foresters, U.S. Air Force, helped to prepare this section.

Approximately 96,000 acres, or 15 percent, of the total land area in Highlands County is woodland. Nearly all of this land is privately owned. Much of the land in the county, which was previously wooded, has been converted for pasture use.

Three major types of woodlands in the county support different forest communities. Approximately one-third of the woodlands is composed of the slash pine-longleaf pine type. These forests typically grow on the flatwoods and are the most important type economically. These trees are used for fence posts, pulpwood, and sawtimber. Fully stocked forests on these sites can be expected to produce 1 to 1.5 cords of wood annually.

About 18,000 acres of sand pine, oak-pine, and oak-hickory forests are on the higher sand ridges in the county. These woodlands do not have an economic value but are important for their wildlife value. Because these sites are favored for development, these forest communities and their associated wildlife species are becoming increasingly rare.

The remaining forest land is made up of the oak-gum-cypress type. These forests are in, or are adjacent to, freshwater swamps along drainage systems and lakes. Although cypress has a minor economic value, this forest type is most valuable for the wildlife that inhabit the forests and for the water resources they protect.

Historically, forest land in the county has not been protected. Private development, conversion to pastureland, and damage from wildfires have all reduced the woodland acreage. However, wherever forests are protected from fire, the slash, and longleaf pine forests have reestablished themselves.

Some markets for forest products are in the county. Fence-post and sawtimber sales are relatively steady, but pulpwood sales can be erratic. In 1984, the estimated primary income from forest land was 421,937 dollars. Management generally consists of protection of natural stands, the use of prescribed fire, and periodic harvests. A notable exception is the Air Force's Avon Park Air Force Range in the northeastern part of the county, which manages over 10,000 acres of planted and natural slash and longleaf pines mainly as commercial forest lands.

Soils vary in their ability to produce trees. Depth, fertility, texture, and the available water capacity influence tree growth. Elevation, aspect, and climate determine the kinds of trees that can grow on a site. Available water capacity and depth of the root zone are major influences of tree growth.

This soil survey can be used by woodland managers planning ways to increase the productivity of forest land. Some soils respond better to fertilization than

others, and some are more susceptible to erosion after roads are built and timber is harvested. Some soils require special efforts to reforest. In the section "Detailed Soil Map Units," each map unit in the survey area suitable for producing timber presents information about productivity, limitations for harvesting timber, and management concerns for producing timber. The common forest understory plants are also listed. Table 6 summarizes this forestry information and rates the soils for a number of factors to be considered in management. *Slight, moderate*, and *severe* are used to indicate the degree of the major soil limitations to be considered in forest management.

The first tree listed for each soil under the column "Common trees" is the indicator species for that soil. An indicator species is a tree that is common in the area and that is generally the most productive on a given soil.

Table 6 lists the *ordination symbol* for each soil. The first part of the ordination symbol, a number, indicates the potential productivity of a soil for the indicator species in cubic meters per hectare. The larger the number, the greater the potential productivity. Potential productivity is based on the site index and the point where mean annual increment is the greatest.

The second part of the ordination symbol, a letter, indicates the major kind of soil limitation for use and management. The letter *W* indicates a soil in which excessive water, either seasonal or year-round, causes a significant limitation. The letter *S* indicates a dry, sandy soil. If a soil has more than one limitation, the priority is as follows: W and S.

Ratings of the *erosion hazard* indicate the probability that damage may occur if site preparation activities or harvesting operation expose the soil. The risk is *slight* if no particular preventive measures are needed under ordinary conditions; *moderate* if erosion control measures are needed for particular silvicultural activities; and *severe* if special precautions are needed to control erosion for most silvicultural activities. Ratings of *moderate* or *severe* indicate the need for construction of higher standard roads, additional maintenance of roads, additional care in planning of harvesting and reforestation operations, or use of specialized equipment.

Ratings of *equipment limitation* indicate limits on the use of forest management equipment, year-round or seasonal, because of such soil characteristics as wetness or susceptibility of the surface layer to compaction. The rating is *slight* if equipment use is restricted by soil wetness for less than 2 months and if special equipment is not needed. The rating is *moderate* if soil wetness restricts equipment use from 2 to 6 months per year or if special equipment is needed to avoid or reduce soil compaction. The rating is *severe* if soil wetness restricts equipment use for more than 6 months per year or if special equipment is needed to avoid or reduce soil compaction. Ratings of *moderate* or *severe* indicate a need to choose the most suitable equipment and to carefully plan the timing of harvesting and other management operations.

Ratings of *seedling mortality* refer to the probability of death of naturally occurring or properly planted seedlings of good stock in periods of normal rainfall as influenced by kinds of soil or topographic features. *Seedling mortality* is caused primarily by too much water or too little water. The factors used in rating a soil for seedling mortality are texture of the surface layer, depth and duration of the water table, and rooting depth. Mortality generally is greatest on soils that have a sandy or clayey surface layer. The risk is *slight* if, after site preparation, expected mortality is less than 25 percent; *moderate* if, expected mortality exceeds 50 percent. Ratings of *moderate* or *severe* indicate that it may be necessary to use containerized or larger than usual planting stock or to make special site preparations, such as bedding, furrowing, installing surface drainage, or providing artificial shade for seedlings. Reinforcement planting is often needed if risk is *moderate* or *severe*.

Ratings of *windthrow hazard* consider the likelihood of trees being uprooted by the wind. Restricted rooting depth is the main reason for windthrow. Rooting depth can be restricted by a high water table, fragipan, or bedrock, or by a combination of such factors as soil wetness, texture, structure, and depth. The risk is *slight* if strong winds cause trees to break but do not uproot them; *moderate* if strong winds cause an occasional tree to be blown over and many trees to break; and *severe* if moderate or strong winds commonly blow trees over. Ratings of *moderate* or *severe* indicate the need for care in thinning or possibly not thinning. Specialized equipment may be needed to avoid damage to shallow root systems in partial cutting operations. A plan for periodic salvage of windthrown trees and the maintenance of a road and trail system may be needed.

Ratings of *plant competition* indicate the likelihood of the growth or invasion of undesirable plants. *Plant competition* becomes more severe on the more productive soils, on poorly drained soils, and on soils having a restricted root zone that holds moisture. The risk is *slight* if competition from undesirable plants reduces adequate natural or artificial reforestation but does not necessitate intensive site preparation and

maintenance. The risk is *moderate* if competition from undesirable plants reduces natural or artificial reforestation to the extent that intensive site preparation and maintenance are needed. The risk is *severe* if competition from undesirable plants prevents adequate natural or artificial reforestation unless the site is intensively prepared and maintained. A *moderate* or *severe* rating indicates the need for site preparation to ensure the development of an adequately stocked stand. Managers must plan site preparation measures to ensure reforestation without delays.

The potential productivity of *common trees* on a soil is expressed as a *site index*. Common trees are listed in the order of their observed general occurrence. Generally, only two or three tree species dominate.

The soils that are commonly used to produce timber have the yield predicted in cubic meters. The yield is predicted at the point where mean annual increment culminates.

The *site index* is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The site index is based on an age of 25 years for South Florida slash pine and 50 years for all other trees. The site index values given in table 6 are based on standard procedures and techniques *(8, 9, 13)*.

The *productivity class* represents an expected volume produced by the most important trees, expressed in cubic meters per hectare per year. Cubic meters per hectare can be converted to cubic feet per acre by multiplying by 14.3. It can be converted to board feet by multiplying by a factor of about 71. For example, a productivity class of 8 means the soil can be expected to produce 114 cubic feet pre acre per year at the point where mean annual increment culminates, or about 568 board feet per acre per year.

Trees to plant are those that are used for reforestation or, if suitable conditions exist, natural regeneration. They are suited to the soils and will produce a commercial wood crop. Desired product, topographic position (such as a low, wet area), and personal preference are three factors of many that can influence the choice of trees to use for reforestation.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To insure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Additional information on planning windbreaks and screens and on planting and caring for trees and shrubs can be obtained from local offices of the Soil Conservation Service or the Cooperative Extension Service, or from a nursery.

Recreation

Facilities are available in Highlands County for a wide variety of recreation activities. With an abundance of freshwater lakes, there are many opportunities for fishing, sailing, water skiing, canoeing, and skin diving. Numerous fish camps are in the county, and most of the lakes have public access boat ramps. Highlands Hammock State Park provides camping and nature paths. Avon Park Bombing Range also provides an outlet for hunting, fishing, and camping on more than 50,000 acres. Numerous golf courses are throughout the county, and many are public courses. A wide variety of privately owned campgrounds provides temporary living facilities for people from northern states during the winter months. Most municipalities have public picnic and recreational areas and tennis, racquetball, and basketball courts. Sebring provides a boat ramp, civic center, and cultural center that are within walking distance of downtown.

In table 7, the soils of the survey area are rated according to the limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for

recreational use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 7, the degree of soil limitation is expressed as moderate or severe. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset by soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 7 can be supplemented by other information in this survey, for example, interpretations for septic tank absorption fields in table 10 and interpretations for dwellings without basements and for local roads and streets in table 9.

Camp areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils have gentle slopes and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is firm after rains and is not dusty when dry.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have moderate slopes.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

John Vance, biologist, Soil Conservation Service, helped to prepare this section.

Wildlife is a valuable resource of Highlands County. The wetland areas and native rangelands along the Kissimmee River, Arbuckle Creek, Charley Bowlegs Creek, and Fisheating Creek provide particularly valuable habitat. The 3,700 acre Archbold Research Station, the 3,500 acre Highlands Hammock State Park, and the 51,000 acre Avon Park Bombing Range are especially important.

The primary game species include white-tailed deer, squirrel, wild turkey, bobwhite quail, feral hogs, and waterfowl. Nongame species include raccoon, rabbit, armadillo, opossum, skunk, bobcat, gray fox, otter, mink, and a variety of songbirds, wading birds, woodpeckers, predatory birds, reptiles, and amphibians.

The major streams and hundreds of natural lakes in Highlands County provide good fish habitat. Twenty-seven lakes are over 100 acres in size. These include four that are over 1,000 acres and Lake Istokpoga, the largest, which covers about 28,000 acres. Important fish species include largemouth bass, channel catfish, bullhead catfish, warmouth, bluegill, redear, red-bellied and spotted sunfish, black crappie, chain pickerel, gar, and bowfin, and suckers.

Areas of concern include the habitat changes caused by intensive agriculture practices, such as citrus and improved pastures. Many native rangeland areas could offer better wildlife habitat if poor grazing and burning practices could be improved. The increasing urban development down the central ridge is eliminating much wildlife habitat.

A number of endangered or threatened species are in Highlands County. These include the seldom seen red-cockaded woodpecker to the more commonly known species, such as the wood stork. A detailed list of these species with information on range and habitat needs is available from the local office of the Soil Conservation Service.

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

In table 8, the soils in the survey area are rated according to their potential for providing habitat for

various kinds of wildlife. This information can be used in planning parks, wildlife refuges, nature study areas, and other developments for wildlife; in selecting soils that are suitable for establishing, improving, or maintaining specific elements of wildlife habitat; and in determining the intensity of management needed for each element of the habitat.

The potential of the soil is rated good, fair, poor, or very poor. A rating of *good* indicates that the element or kind of habitat is easily established, improved, or maintained. Few or no limitations affect management, and satisfactory results can be expected. A rating of *fair* indicates that the element or kind of habitat can be established, improved, or maintained in most places. Moderately intensive management is required for satisfactory results. A rating of *poor* indicates that limitations are severe for the designated element or kind of habitat. Habitat can be created, improved, or maintained in most places, but management is difficult and must be intensive. A rating of *very poor* indicates that restrictions for the element or kind of habitat are very severe and that unsatisfactory results can be expected. Creating, improving, or maintaining habitat is impractical or impossible.

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of grain and seed crops are browntop millit and grain sorghum.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, flood hazard, and slope. Soil temperature and soil moisture are also considerations. Examples of grasses and legumes are bahiagrass, pangolagrass, clover, and aschynomene.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, and flood hazard. Soil temperature and soil moisture are also considerations. Examples of wild herbaceous plants are bluestem, goldenrod, beggarweed, and partridge pea.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage. Soil properties and features that affect the growth of hardwood trees and shrubs are depth of the root zone, the available water capacity, and wetness. Examples of these plants are oak, maple, gallberry, saw palmetto, huckleberry, hickory, and blackberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are pine and cypress.

Wetland plants are annual and perennial, wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, and reaction. Examples of wetland plants are smartweed, wild millet, pickerelweed, arrowhead, cordgrass, rushes, sedges, and reeds.

Shallow water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples of shallow water areas are marshes, waterfowl feeding areas, and ponds.

The habitat for various kinds of wildlife is described in the following paragraphs.

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, shrubs, and vines. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include bobwhite quail, burrowing owl, meadowlark, dove, sandhill crane, and cattle egret.

Habitat for woodland wildlife consists of areas of deciduous plants or coniferous plants or both and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to these areas include wild turkey, owls, woodpeckers, squirrels, gray fox, raccoon, deer, and bear.

Habitat for wetland wildlife consists of open, marshy or swampy shallow water areas. Some of the wildlife attracted to such areas are ducks, herons, shore birds, otters, alligators, egrets, and gallinules.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are

given in the following tables: Building site development, Sanitary facilities, Construction materials, and Water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet, and because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations must be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial, and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable that special design, soil reclamation, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to a very firm dense layer, soil texture, and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. Depth to a high water table and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base

of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills are generally limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to a high water table, flooding, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, depth to a high water table, and the available water capacity in the upper 40 inches affect plant growth. Flooding, wetness, slope, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Controlling Erosion on Building Sites

Soil erosion is a problem in disturbed areas. Water erosion can damage sloping soils if rains are intense and the soils are bare of vegetation and surface mulch.

The disturbing or clearing of areas for construction operations or for landscaping removes vegetation and leaves the soil vulnerable to erosion. Wind and water erosion can be reduced by clearing or disturbing only the minimum area necessary for construction.

Exposed soil results in wind erosion and sedimentation of streams. Control of erosion minimizes the pollution of streams by sediment and improves the quality of water for municipal use, for recreation, and for fish and wildlife.

Grading removes topsoil and can expose the sandy clay loam or sandy clay subsoil in Bradenton, Felda, and Pineda soils. Ripping the exposed subsoil and covering it with less erodible topsoil reduce erosion.

Wind erosion is a major hazard on sandy soil. It can damage soils in a few hours in open, unprotected areas if the winds are strong and the soil is dry and bare of vegetation and surface mulch. Drifting soil can inundate drainage ditches, roads, fences, and equipment. The air pollution caused by wind erosion can create health problems. Wind erosion can be minimized by maintaining plant cover and surface mulch and by planting windbreaks of trees and shrubs.

Mulching helps to reduce damage from erosion and improves soil moisture conditions for seedlings.

Information about conservation practices to control erosion is available in local offices of the Soil Conservation Service.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are unfavorable for the indicated use and overcoming the unfavorable properties requires special design, extra maintenance, or alteration.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and that good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a high water table, and flooding affect absorption of the effluent.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is

required to minimize seepage and contamination of ground water.

Table 10 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, depth to a high water table, flooding, and content of organic matter.

Excessive seepage due to rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope can cause construction problems.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill—trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to a water table, slope, and flooding affect both types of landfill. Texture, highly organic layers, and soil reaction, affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by a high water table and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, low shrink-swell potential, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell

potential, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils is generally preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and releases a variety of plant-available nutrients as it decomposes.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed ponds. The limitations are considered *slight* if soil properties and site features are generally favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are somewhat restrictive for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable for the intended use that special design and possibly increased maintenance or alteration are required.

This table also gives the restrictive features that affect each soil for drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth greater than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high

content of organic matter. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a permanent water table. Excluded are ponds that are fed only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and the salinity of the soil.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; and subsidence of organic layers. Excavating and grading and the stability of ditchbanks are affected by slope and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The performance of a system is affected by the depth of the root zone and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope and wetness affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Wetness and slope affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics. These results are reported in table 20.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each soil series under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system *(2)* and the system adopted by the American Association of State Highway and Transportation Officials *(1)*.

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20, or higher, for the poorest. The AASHTO classification for soils tested, with group index numbers

in parentheses, is given in table 20.

Rock fragments larger than 3 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area, or from nearby areas, and on field examination.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They influence the soil's adsorption of cations, moisture retention, shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of movement of water through the soil when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage in each major soil layer is stated in inches of water per inch of soil. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The

change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average annual rate of soil loss by sheet and rill erosion. Losses are expressed in tons per acre per year. These estimates are based primarily on percentage of silt, sand, and organic matter (up to 4 percent) and on soil structure and permeability. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind or water that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the following distinctions:

1. Sands, coarse sands, fine sands, and very fine sands. These soils are generally not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy sands, loamy fine sands, and loamy very fine sands. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

3. Sandy loams, coarse sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.

4L. Calcareous loamy soils that are less than 35 percent clay and more than 5 percent finely divided calcium carbonate. These soils are erodible. Crops can be grown if intensive measures to control wind erosion are used.

4. Clays, silty clays, clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.

5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loams and sandy clays that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.

6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loams. These soils are very slightly erodible. Crops can easily be grown.

7. Silty clay loams that are less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.

8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Soil and Water Features

Table 15 gives estimates of various soil and water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are used to estimate runoff from precipitation. Soils are assigned to one of four groups. They are grouped according to the intake of water when the soils are thoroughly wet and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These

consist chiefly of clays that have high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission. Some of the soils in table 15 have two hydrologic groupings, a B/D listing means that under natural conditions this soil would be in Group D, but because of applied management practices, such as ditching and pumping, the soil may be assigned to Group C or B, depending on the extent of practices applied. Since management practices vary from site to site, it is recommended that site specific investigations be made to determine the proper hydrologic group.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflowing streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in swamps and marshes or in a closed depression is considered ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable dates of occurrence are estimated. Frequency generally is expressed as *none* or *frequent. None* means that flooding is not probable. *Frequent* means that flooding occurs often under normal weather conditions (there is more than a 50 percent chance of flooding in any year). Duration is expressed as *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that floods are most likely to occur is expressed in months. November-June, for example, means that flooding can occur during the period November through June. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely, thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table, that is, *apparent;* and the months of the year that the water table commonly is highest. A water table that is seasonally high for less than 1 month is not indicated in table 15. Table 16 shows water table data of several soils in Highlands County.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil.

The two numbers in the "High water table-Depth" column indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. Table 15 shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Not shown in the table is subsidence caused by an imposed surface load or by the withdrawal of ground water throughout an extensive area as a result of lowering the water table.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severely corrosive environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed

as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and the amount of sulfates in the saturation extract.

Physical, Chemical, and Mineralogical Analyses of Selected Soils

Dr. Victor W. Carlisle, professor of Soil Science, and Dr. W. G. Harris, assistant professor of Soil Science, University of Florida, Agricultural Experiment Station, Soil Science Department, prepared this section.

Parameters for physical, chemical, and mineralogical properties or representative pedons sampled in Highlands County are presented in tables 17, 18, and 19. The analyses were conducted and coordinated by the Soil Characterization Laboratory at the University of Florida. Detailed profile descriptions of the analyzed soils are given in alphabetical order in the section "Classification of the Soils." Laboratory data and profile information for additional soils in Highlands County, as well as for other counties in Florida, are on file at the University of Florida, Soil Science Department.

Typifying pedons were sampled from pits at carefully selected locations. Samples were airdried, crushed, and sieved through a 2 millimeter screen. Most analytical methods used are outlined in Soil Survey Investigations Report No. 1 *(12)*.

Particle-size distribution was determined using a modified pipette method with sodium hexametaphosphate dispersion. Hydraulic conductivity and bulk density were determined on undisturbed soil cores. Water retention parameters were obtained from duplicate undisturbed soil cores placed in tempe pressure cells. Weight percentages of water retained at 100 centimeters water ($1/10$ bar) and 345 centimeters water ($1/3$ bar) were calculated from volumetric water percentages divided by bulk density. Samples were ovendried, ground to pass a 2 millimeter sieve, and 15-bar water retention was determined. Organic carbon was determined by a modification of the Walkley-Black wet combustion method.

Extractable bases were obtained by leaching soils with normal ammonium acetate buffered at pH 7.0. Sodium and potassium in the extract were determined by flame emission. Calcium and magnesium were determined by atomic absorption spectrophotometry. Extractable acidity was determined by the barium chloride-triethanolamine method at pH 8.2. The sum of cations, which may be considered a measure of cation-exchange capacity, was calculated by adding the values for extractable bases and extractable acidity. Base saturation is the ratio of extractable bases to cation-exchange capacity expressed in percent. The pH measurements were made with a glass electrode using a soil-water ratio of 1:1, a 0.01 molar calcium chloride solution in a 1:2 soil-solution ratio; and normal potassium chloride solution in a 1:1 soil-solution ratio.

Electrical conductivity determinations were made with a conductivity bridge on 1:1 soil to water mixtures. Iron and aluminum extractable in sodium dithionite-citrate were determined by atomic absorption spectrophotometry. Aluminum, carbon, and iron were extracted from probable spodic horizons with 0.01 molar sodium pyrophosphate. Determination of aluminum and iron was by atomic absorption and of extracted carbon was by the Walkley-Black wet combustion method.

Mineralogy of the clay fraction less than 2 microns was ascertained by x-ray diffraction. Peak heights at 18 angstrom, 14 angstrom, 10 angstrom, 7.2 angstrom, 4.83 angstrom, 4.31 angstrom, and 3.04 angstrom positions represent montmorillonite, interstratified expandable vermiculite or 14 angstrom intergrades, mica, kaolinite, gibbsite, quartz, and calcite, respectively. Peaks were measured, summed, and normalized to give the percent of soil minerals identified in the x-ray diffractograms. These percentage values do not indicate absolute determined quantities of soil minerals but do imply a relative distribution of minerals in a particular mineral suite. Absolute percentages would require additional knowledge of particle size, crystallinity, unit structure, substitution, and matrix problems.

Physical Properties

Representative soils sampled for laboratory analyses in Highlands County were inherently very sandy (table 17). Some contained argillic horizons in the lower sola. All pedons sampled contained one horizon or more in which the total sand content exceeded 90 percent. Archbold, Astatula, Daytona, Duette, Orsino, Paola, St. Lucie, Satellite, Tavares, and Valkaria soils contained more than 95 percent sand to a depth of 2 meters or more. Immokalee, Placid, Pomello, and Smyrna soils contained more than 90 percent sand to a depth of slightly more than 1 meter.

The content of clay in these excessively sandy soils was rarely more than 2 percent. Frequently, the silt content was slightly higher than the clay content. The

deep argillic horizons of Bradenton, Chobee, EauGallie, Felda, Hicoria, and Malabar soils contained about 12.3 to 22.5 percent clay. Silt content exceeded 10 percent in one horizon of the Chobee soil, but rarely exceeded 4 percent in all of the other soils.

Medium and fine sand dominated the sand fractions throughout all of the soils in Highlands County. All horizons of Daytona, Duette, Orsino, Paola, and Tavares soils contained more than 50 percent medium sand, and Archbold, Astatula, and St. Lucie soils contained more than 60 percent. Only Basinger, Placid, and Valkaria soils contained in excess of 50 percent fine sand throughout. Fine sands dominated Bradenton, Chobee, EauGallie, Felda, Hicoria, Immokalee, Malabar, Satellite, and Smyrna soils. Very coarse sands were not detectable in Archbold, Astatula, Basinger, Daytona, Duette, Felda, Orsino, Paola, Placid, Pomello, St. Lucie, Satellite, and Valkaria soils and were barely detectable in all the other soils in the county. Generally, coarse sands, ranging from 1 to 5 percent, was in all horizons of all of the soils. All horizons of Bradenton, Felda, Smyrna, and Valkaria soils contained more than 25 percent very fine sand. Hicoria and Malabar soils contained horizons that had more than 25 percent very fine sand. Daytona, Duette, Orsino, and Paola soils contained less than 1 percent very fine sands. These sandy soils in Highlands County rapidly become very droughty during periods of low precipitation when rainfall is widely scattered. Conversely, these sandy soils are rapidly saturated when high amounts of rainfall occur. Soils with inherently poor drainage, such as Basinger, Bradenton, Chobee, EauGallie, Felda, Hicoria, Immokalee, Malabar, Placid, Smyrna, and Valkaria soils, may remain saturated with ground water close to the surface for long periods.

Hydraulic conductivity values usually were well in excess of 50 centimeters per hour throughout the Typic and Spodic Quartzipsamment pedons but rarely exceeded 1.0 centimeters per hour in the lower sola of soils containing argillic horizons. Low hydraulic conductivity values at shallow depths in such soils as Bradenton and Chobee soils could affect the design and function of septic tank absorption fields. Low hydraulic conductivity values were also recorded for spodic horizons in EauGallie soil, but hydraulic conductivity for Bh horizons in Immokalee, Pomello, and Smyrna soils were higher than generally recorded for spodic horizons of most Florida soils. The available water for plants can be estimated from bulk density and water content data. The excessively sandy soils, such as Archbold, Astatula, Paola, St. Lucie, Satellite, and Tavares sands, retain very low amounts of available water for plants. Conversely, soils with a higher amount of fine textured materials and a higher content of organic matter, such as Chobee fine sandy loam and Hicoria mucky sand, retain much larger amounts of available water for plants.

Chemical Properties

Chemical soil properties (table 18) show that a wide range of extractable bases was present in Highlands County soils. With exception of Chobee fine sandy loam, all of the other soils contained one or more horizons that had less than 1 milliequivalent per hundred grams extractable bases. Chobee soils ranged from 7.43 to 20.74 milliequivalents per hundred grams extractable bases; however, somewhat higher amounts of extractable bases occurred in the deeper horizons of Bradenton fine sand, ranging from 24.86 to 37.55 milliequivalents per hundred grams. Archbold, Duette, Paola, Pomello, St. Lucie, and Satellite soils contained less than 1 milliequivalent per hundred grams extractable bases throughout the depth of the soil. The mild, humid climate of Highlands County results in depletion of basic cations (calcium, magnesium, sodium, and potassium) through leaching.

With the exception of EauGallie fine sand, calcium was the dominant base in all of the other soils in the county. Magnesium exceeded the amount of calcium in the deeper horizons of EauGallie soil and in one or two deeper horizons of Basinger, Immokalee, Placid, and Pomello soils. All of the soils but Archbold, Basinger, Daytona, Duette, EauGallie, Paola, Placid, Pomello, St. Lucie, and Satellite soils contained one or more horizons in which the calcium content exceeded 1 milliequivalent per hundred grams. Extractable magnesium of 1 milliequivalent or more occurred only in one or more horizons of Basinger, Bradenton, Chobee, EauGallie, Felda, Hicoria, and Malabar soils. The highest amounts of extractable calcium and magnesium occurred in Bradenton and Chobee soils. Sodium generally occurred in amounts that were much less than 0.2 milliequivalents per hundred grams; however, one or more horizons in Bradenton, Felda, Hicoria, Immokalee, Malabar, and Placid soils exceeded this value. Archbold, Astatula, Paola, St. Lucie, Satellite, and Tavares soils contained 0.02 milliequivalents of sodium to a depth of 2 meters or more. All soils contained one or more horizons that had 0.03 milliequivalents per hundred grams or less extractable potassium. Archbold, Basinger, Daytona, Duette,

EauGallie, Felda, Immokalee, Orsino, Paola, Placid, Pomello, St. Lucie, Satellite, Tavares, and Valkaria soils contained horizons that had nondetectable amounts of potassium.

Values for cation-exchange capacity, an indicator of plant nutrient capacity, exceeded 10 milliequivalents per hundred grams in the surface horizon of Bradenton, Chobee, Hicoria, and Placid soils. Enhanced cation-exchange capacities paralleled the higher clay contents occurring in the deeper horizons of Bradenton, Chobee, EauGallie, Felda, Hicoria, and Malabar soils. Soils with low cation-exchange capacity in the surface horizon, such as Archbold, Pomello, and St. Lucie soils, require only small amounts of lime or sulfur to significantly alter both the base status and soil reaction. Generally, soils of low inherent soil fertility are associated with low values for extractable bases and low cation-exchange capacity. Fertile soils are associated with high values for extractable bases, high base saturation values, and high cation-exchange capacity.

The content of organic carbon was less than 1 percent in Archbold, Astatula, Basinger, Duette, Paola, Pomello, St. Lucie, Satellite, Tavares, and Valkaria soils and in all horizons below the surface layer in Bradenton, Daytona, Felda, Malabar, Orsino, and Placid soils. Only Chobee, Hicoria, and Placid soils contained horizons with more than 3 percent organic carbon. Daytona, Duette, EauGallie, Immokalee, Pomello, and Smyrna soils contained Bh horizons with enhanced amounts of organic carbon ranging from 0.49 percent in Daytona soil to 2.68 percent in Smyrna soil. In the other soils, the content of organic carbon decreased rapidly with increased depth. Since the content of organic carbon in the surface layer is directly related to the soil nutrient and available water capacity of sandy soils, management practices that conserve and maintain the amount of organic carbon are highly desirable.

Electrical conductivity values were all very low ranging from nondetectable throughout EauGallie and Satellite soils to 0.19 millimohs per centimeter in the surface soil of Smyrna sand. These data indicate that the content of soluble salt in soils sampled in Highlands County was insufficient to detrimentally affect the growth of salt-sensitive plants.

The ratio of sodium pyrophosphate extractable carbon and aluminum to clay in the Bh horizon of Duette, EauGallie, Immokalee, Pomello, and Smyrna soils was sufficient to meet chemical criteria for spodic horizons. Field morphology was used to determine spodic horizons in the Daytona soil. The Bh horizons in this soil did not meet all chemical criteria for spodic horizons. Pyrophosphate extractable iron and aluminum ratio to citrate-dithionite extractable iron and aluminum was sufficient to meet spodic horizon criteria for all spodosols. Sodium pyrophosphate extractable iron was less than 0.02 percent for all of these soils except Daytona soil, which contained 0.26 percent extractable iron.

Citrate-dithionite extractable iron in the Bt horizon of Bradenton, Chobee, EauGallie, Felda, Hicoria, and Malabar soils ranged from 0.08 to 0.84 percent and was generally less than 0.30 percent. Aluminum extracted by citrate-dithionite from the Bt horizon in these soils ranged from 0.03 to 0.09 percent. Larger amounts of citrate-dithionite iron generally occurred in the Bh horizon as compared to the Bt horizon. The amounts of iron and aluminum in Highlands County soils were not sufficient to detrimentally affect phosphorus availability.

Mineralogical Properties

Sand fractions of 2 to 0.05 millimeters were siliceous, and quartz was overwhelmingly dominant in all pedons. Small amounts of heavy minerals occurred in most horizons with greatest concentrations in the very fine sand fraction. No weatherable minerals were observed. Crystalline mineral components of the clay fraction of 0.002 millimeters are reported in table 19 for major horizons of the pedons sampled. The clay mineralogical suite was composed mostly of montmorillonite, a 14-angstrom intergrade, kaolinite, gibbsite, and quartz.

Montmorillonite occurred in all soils sampled except in Immokalee and Smyrna soils. The 14-angstrom intergrade mineral occurred in most soils but was not detectable in Archbold, Bradenton, Chobee, EauGallie, Felda, Hicoria, Immokalee, and Satellite pedons. Kaolinite occurred in all soils sampled but was not detected in the Btg horizon of Bradenton soil, the A horizon of Chobee soil, the Ap horizons of Felda, Malabar, and Smyrna soils, and the Bw1 horizon of Valkaria soil. Gibbsite was detected only in Placid and Smyrna soils. Varying amounts of quartz occurred in all horizons of all of the soils. Orsino and St. Lucie soils contained horizons that had detectable amounts of calcite, and St. Lucie soil also contained one horizon that had detectable amounts of mica; however, quantities of both these minerals were insufficient for the assignment of numerical values.

Montmorillonite in Highlands County soils was generally inherited from the sediments in which these soils formed. The stability of montmorillonite is generally favored by alkaline conditions. Montmorillonite is

generally most abundant in areas where alkaline elements have not been leached by percolation rainwater, such as soils saturated with limestone-influenced ground waters; however, it may occur in moderate amounts regardless of drainage of chemical conditions.

The 14-angstrom intergrade is a mineral of uncertain origin that is widespread in Florida soils. It tends to be most prevalent under moderately acidic, relatively well-drained conditions; although, it occurs in a variety of soil environments. This mineral is the major constituent of sand grain coatings in the Astatula and Tavares soils of Highlands County; however, amounts of coatings that occur in these soils are not sufficient to meet taxonomic criteria established for the recognition of coated Typic Quartzipsamments.

Kaolinite may have been inherited from the parent material, or it may have formed as a weathering product of other minerals. It is relatively stable in the acidic environments of Highlands County soils. Clay-size quartz has primarily resulted from decrements of the silt fraction.

Clay mineralogy can have a significant impact on soil properties, particularly for soils of higher clay content. Soils that contain montmorillonite have a higher capacity for plant nutrient retention than soils dominated by kaolinite, 14-angstrom intergrade minerals, and quartz. Large amounts of montmorillonitic clay can create problems for most types of construction because of the large amounts of swelling when wet and shrinking when dry. In most Highlands County soils, the clay mineralogy influences their use and management less frequently than the total clay content.

Engineering Index Test Data

Table 20 shows laboratory test data for several pedons sampled at carefully selected sites in the county. The pedons are typical of the series and are described in the section "Soil Series and Their Morphology." The soil samples were tested by the Florida Department of Transportation Soils Laboratory, Bureau of Materials and Research.

The testing methods generally are those of the American Association of State Highway and Transportation Officials (AASHTO) *(1)* or the American Society for Testing and Materials (ASTM) *(2)*.

Table 20 contains engineering test data about some of the major soils in Highlands County. These tests help evaluate the soils for engineering purposes. The classifications given are based on data obtained by mechanical analysis and by tests to determine liquid limits and plastic limits.

The mechanical analyses were made by a combined sieve and hydrometer method *(4)*. In this method, the various grain-size fractions are calculated on the basis of all the material in the soil sample, including that coarser than 2 millimeters in diameter. The mechanical analyses used in this method should not be used in naming textural classes of soils.

Liquid limit and plasticity index indicate the effect of water on the strength and consistence of the soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a semisolid to plastic state. If the moisture content is further increased, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state, and the liquid limit is the moisture content at which the soil material changes from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic. The data on liquid limit and plasticity index in table 20 are based on laboratory tests of soil samples.

Compaction, or moisture-density, data are important in earthwork. If soil material is compacted at a successively higher moisture content, assuming that the compactive effort remains constant, the density of the compacted material increases until the optimum moisture content is reached. After that, density decreases with an increase in moisture content. The highest dry density obtained in the compactive test is termed maximum dry density. As a rule, maximum strength of earthwork is obtained if the soil is compacted to the maximum dry density.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories *(11)*. Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or on laboratory measurements. Table 21 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders, primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Psammaquents (*Psamm*, meaning sand texture, plus *aquent*, the suborder of the Entisols that has an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Spodic* identifies the subgroup that typifies the great group. An example is Spodic Psammaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, depth of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is siliceous, hyperthermic Spodic Psammaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. There can be some variation in the texture of the surface layer or of the substratum within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. The soil is compared with similar soils and with nearby soils of other series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual (10)*. Many of the technical terms used in the descriptions are defined in *Soil Taxonomy (11)*. Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the series.

The map units of each soil series are described in the section "Detailed Soil Map Units."

Anclote Series

The Anclote series consists of very poorly drained soils that formed in thick beds of sandy marine sediment. These soils are on the flood plains along Fisheating Creek. The slopes range from 0 to 2 percent. The soils of the Anclote series are sandy, siliceous, hyperthermic Typic Haplaquolls.

Anclote soils are closely associated with Basinger, Hicoria, Hontoon, and Samsula soils. Basinger soils do not have a mollic epipedon and have layers of organic staining. Hicoria soils have an argillic horizon. Hontoon and Samsula are organic soils.

Typical pedon of Anclote fine sand, in an area of Anclote-Basinger fine sands, frequently flooded; approximately 200 feet south and 1,800 feet east of the northwest corner, sec. 28, T. 39 S., R. 29 E.

A—0 to 20 inches; very dark gray (10YR 3/1) fine sand; weak medium granular structure; very friable; slightly acid; clear smooth boundary.

Cg1—20 to 30 inches; dark gray (10YR 4/1) fine sand; single grained; loose; moderately alkaline; gradual wavy boundary.

Cg2—30 to 80 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; moderately alkaline.

The soil reaction is medium acid to moderately alkaline.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2.

The Cg horizon has a hue of 10YR to 5Y, value of 2 to 6, and chroma of 1 or 2.

Archbold Series

The Archbold series consists of nearly level to gently sloping, moderately well drained, droughty soils that formed in marine and eolian deposits. These soils are on moderately high ridges in the ridge part of the county. The slopes range from 0 to 5 percent. The soils of the Archbold series are hyperthermic, uncoated Typic Quartzipsamments.

Archbold soils are closely associated with Basinger, Placid, St. Lucie, and Satellite soils. Basinger soils have a B/E horizon and are poorly drained or very poorly drained. Placid soils have an umbric epipedon and are very poorly drained. St. Lucie soils are excessively drained, and Satellite soils are somewhat poorly drained.

Typical pedon of Archbold sand, 0 to 5 percent slopes; on the Archbold Biological Station; approximately 1,500 feet north and 200 feet east of the southwest corner, sec. 7, T. 38 S., R. 30 E.

A—0 to 4 inches; gray (10YR 6/1) sand; single grained; loose; many fine and medium roots; strongly acid; gradual wavy boundary.

C—4 to 80 inches; white (10YR 8/1) sand; single grained; loose; few fine and medium roots; medium acid.

The soil reaction is slightly acid to extremely acid. The texture is sand or fine sand. The content of silt plus clay in the 10- to 40-inch control section is less than 2 percent.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. Some pedons have a slightly decomposed thin layer of leaves on the surface.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2; or it is neutral (N) and has value of 6 to 8. In some pedons, there is staining along old root channels.

Astatula Series

The Astatula series consists of nearly level to moderately sloping, excessively drained, droughty soils that formed in marine and eolian deposits. These soils are wholly within the ridge part of the county. The slopes range from 0 to 8 percent. The soils of the Astatula series are hyperthermic, uncoated Typic Quartzipsamments.

Astatula soils are closely associated with Archbold, Orsino, Paola, St. Lucie, and Tavares soils. Archbold, Orsino, and Tavares soils have zones of saturation between depths of 36 to 60 inches. Paola soils have an albic horizon. St. Lucie soils have value of 7 or 8 and chroma of 1 or 2 in the C horizon.

Typical pedon of Astatula sand, 0 to 8 percent slopes; in an orange grove; 300 feet north and 1,400 feet east of the southwest corner, sec. 6, T. 34 S., R. 29 E.

Ap—0 to 7 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; many fine and very fine roots; few medium roots; very strongly acid; gradual wavy boundary.

C—7 to 80 inches; brownish yellow (10YR 6/6) sand; single grained; loose; few fine and medium roots; very strongly acid.

The soil reaction ranges from very strongly acid to slightly acid. The texture below the surface layer ranges from sand to fine sand to a depth of 80 inches or more.

Silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A or Ap horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 4 to 8.

Basinger Series

The Basinger series consists of nearly level, poorly drained and very poorly drained soils that formed in marine sand. These soils are on low flatwoods and in sloughs, depressions, and drainageways in the county. The slopes range from 0 to 2 percent. The soils of the Basinger series are siliceous, hyperthermic Spodic Psammaquents.

Basinger soils are closely associated with Immokalee, Myakka, Placid, Satellite, and Valkaria soils. Immokalee and Myakka soils are in slightly higher positions than Basinger soils and have a spodic horizon. Placid soils have a thicker surface horizon than Basinger soils, Satellite soils do not have a diagnostic horizon and are better drained, and Valkaria soils have higher chromas.

Typical pedon of Basinger fine sand; on the Avon Park Air Force Range; 400 feet north and 1,400 feet west of the southwest corner, sec. 6, T. 33 S., R. 30 E.

Ap—0 to 6 inches; dark gray (10YR 4/1) fine sand, rubbed; weak fine granular structure; very friable; common medium and many fine and very fine roots; medium acid; clear smooth boundary.

E1—6 to 16 inches; light gray (10YR 7/1) fine sand; single grained; loose; many fine and few medium roots; slightly acid; gradual wavy boundary.

E2—16 to 21 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; medium acid; gradual wavy boundary.

Bh/E—21 to 52 inches; discontinuous very dark grayish brown (10YR 3/2) spodic material in the upper 4 inches and many small bodies throughout (Bh), brown (10YR 5/2) fine sand (E); single grained; loose; medium acid; gradual wavy boundary.

C1—52 to 62 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

C2—62 to 80 inches; grayish brown (10YR 5/2) loamy fine sand; single grained; nonsticky and nonplastic; extremely acid.

The soil reaction ranges from extremely acid to neutral. The texture below the A horizon is sand or fine sand.

The A or Ap horizon has hue of 10YR, value of 2 to 5, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 to 3.

The Bh part of the Bh/E horizon has hue of 10YR, value of 3 or 4, and chroma of 1 to 3; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 3, and chroma of 2. In many pedons, the Bh horizon is not mixed with the E horizon. The E part has properties similar to those described for the E horizon.

The C horizon has hue of 10YR, value of 5 to 6, and chroma of 1 or 2; or hue of 10YR, value of 4, and chroma of 3. In some pedons, the texture in the lower part of the C horizon is loamy sand or loamy fine sand.

Bradenton Series

The Bradenton series consists of nearly level, poorly drained soils that formed in loamy marine sediment influenced by calcareous materials. These soils are on hammocks and in open areas on the flatwoods. The slopes range from 0 to 2 percent. The soils of the Bradenton series are coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs.

Bradenton soils are closely associated with Felda, Hicoria, Malabar, Myakka, and Pineda soils. Felda soils have an argillic horizon between depths of 20 and 40 inches. Hicoria soils have an umbric epipedon and are in depressions. Malabar and Pineda soils have a Bw horizon. Myakka soils have a spodic horizon.

Typical pedon of Bradenton fine sand; approximately 2,400 feet east and 1,300 feet south of the northwest corner, sec. 1, T. 38 S., R. 31 E.

Ap—0 to 4 inches; dark gray (10YR 4/1) fine sand; weak fine granular structure; very friable; strongly acid; clear smooth boundary.

E—4 to 14 inches; light gray (10YR 7/1) fine sand; single grained; loose; strongly acid; clear smooth boundary.

Btg—14 to 29 inches; gray (10YR 6/1) very fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; friable; moderately alkaline; gradual wavy boundary.

Btgk—29 to 44 inches; gray (10YR 6/1) very fine sandy loam; common medium prominent yellowish brown (10YR 5/8) mottles; common or many white calcium carbonate nodules; massive; friable; moderately

alkaline; calcareous; gradual wavy boundary.

Cgk1—44 to 66 inches; light brownish gray (10YR 6/2) loamy sand; few fine distinct brownish yellow (10YR 6/8) mottles; common or many white calcium carbonate nodules; massive; friable; moderately alkaline; calcareous; gradual wavy boundary.

Cgk2—66 to 80 inches; greenish gray (5GY 5/1) very fine sandy loam; common medium prominent brownish yellow (10YR 6/8) mottles; common or many white calcium carbonate nodules; massive; friable; mildly alkaline; calcareous.

The thickness of the solum ranges from 20 to 50 inches. The reaction ranges from strongly acid to neutral in the A and E horizons. The Bt and C horizons range from neutral to strongly alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 3 to 7, and chroma of 1 or 2. This horizon may have mottles in shades of brown, red, and yellow. The texture is fine sandy loam, sandy loam, or very fine sandy loam. The carbonate content increases as depth increases.

The Ck horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2; or hue of 5GY, value of 6, and chroma of 1 or 2. The texture ranges from sand to sandy clay loam. Some pedons have fine shell fragments.

Brighton Series

The Brighton series consists of nearly level, very poorly drained soils that formed in decomposing organic material underlain by marine sediment. These soils are mainly in large forested wetland areas within the county. The largest of these areas is on the south side of Lake Istokpoga. The slopes range from 0 to 1 percent. The soils of the Brighton series are dysic, hyperthermic Typic Medihemists.

Brighton soils are closely associated with Basinger, Hontoon, Placid, and Samsula soils. Basinger and Placid soils are mineral soils that normally are adjacent to Brighton soils. Hontoon and Samsula soils are organic soils that contain organic materials that are highly decomposed.

Typical pedon of Brighton muck; in a drained field of caladiums; on Highlands County Road 621, 100 feet west of the northeast corner, sec. 3, T. 37 S., R. 30 E.

Op—0 to 12 inches; black (10YR 2/1) muck; about 4 percent rubbed fiber; weak medium granular structure; loose to friable; dark brown (10YR 4/3) sodium pyrophosphate extract; common fine roots; extremely acid; (pH 3.7 in 0.01 molar calcium chloride solution); gradual wavy boundary.

Oe—12 to 80 inches; dark reddish brown (5YR 3/3) hemic material (peat); about 25 percent rubbed fiber; massive; friable; gray (10YR 5/1) sodium pyrophosphate extract; common medium and fine roots; extremely acid; (pH 3.5 in 0.01 molar calcium chloride solution).

The thickness of the organic material is more than 51 inches. In some areas, it is up to 15 feet thick. The organic material has pH value of less than 4.5 in 0.01 molar calcium chloride solution and has a pH range of 3.5 to 5.5 by the Hellige-Truog method.

The Oa or Op horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 5YR, value of 2 or 3, and chroma of 1 to 3; or it is neutral (N) and has value of 2. The fiber content is about 20 percent, unrubbed. The rubbed fiber content is about 10 percent or less.

The Oe horizon has hue of 10YR or 5YR, value of 1 to 3, and chroma of 1 to 3. The fiber content is about 40 to 60 percent, unrubbed. The rubbed fiber is about 16 to 40 percent.

Chobee Series

The Chobee series consists of nearly level, very poorly drained soils that formed in thick beds of loamy marine sediment. These soils are in small to large depressions on the flatwoods and in some swamps and marshes in the county. The slopes range from 0 to 1 percent. The soils of the Chobee series are fine-loamy, siliceous, hyperthermic Typic Argiaquolls.

Chobee soils are closely associated with Basinger, Felda, Hicoria, and Tequesta soils. Basinger soils have a Bh horizon. Felda soils have a Bt horizon between depths of 20 to 40 inches and do not have a mollic epipedon. Hicoria soils have a Bt horizon between depths of 20 to 40 inches. Tequesta soils have an organic surface layer 6 to 16 inches thick.

Typical pedon of Chobee fine sandy loam, depressional; in a marsh on the Avon Park Air Force Range; 2,700 feet south and 1,400 feet west of the northeast corner, sec. 17, T. 33 S., R. 30 E.

A—0 to 18 inches; black (10YR 2/1) fine sandy loam; weak medium granular structure; friable; upper 3 inches stratified muck and fine sandy loam; many or

common fine and very fine roots; strongly acid; gradual wavy boundary.

Btg1—18 to 36 inches; gray (5Y 5/1) sandy clay loam; massive; friable; slightly acid; gradual wavy boundary.

Btg2—36 to 57 inches; dark gray (5Y 4/1) fine sandy loam; many fine prominent yellowish brown (10YR 5/6) mottles; few medium prominent white (10YR 8/1) sand pockets; weak coarse subangular blocky structure; friable; neutral; gradual wavy boundary.

Cg—57 to 80 inches; gray (5Y 5/1) fine sand; common sand pockets; weak fine subangular blocky structure; friable; mildly alkaline.

A thin Oa horizon is on the surface of this soil in many pedons. It has hue of 10YR or 5YR, value of 2, and chroma of 1 or 2.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2. The reaction ranges from strongly acid to neutral.

The Btg horizon has hue of 10YR, value of 2 to 6, and chroma of 1. This horizon may have mottles of brown. The reaction of the Btg horizon ranges from neutral to moderately alkaline. Texture is mostly sandy clay loam; but, in parts, the texture is sandy loam and fine sandy loam.

The Cg horizon has hue of 10YR, value of 5 or 6, and chroma of 1; or hue of 5GY, value of 5 or 6, and chroma of 1. The reaction ranges from mildly acid to moderately alkaline. The texture is sand, fine sand, or loamy sand.

Daytona Series

The Daytona series consists of nearly level to gently sloping, moderately well drained, droughty soils that formed in marine sand. These soils are on elevated ridges on the flatwoods and on moderately high ridges in the ridge part of the county. The slopes range from 0 to 5 percent. The soils of the Daytona series are sandy, siliceous, hyperthermic Entic Haplohumods.

Daytona soils are closely associated with Archbold, Duette, Immokalee, Orsino, Paola, Pomello, and Satellite soils. Archbold, Orsino, and Satellite soils do not have a spodic horizon. Duette soils have a Bh horizon below a depth of 50 inches. Immokalee soils are poorly drained. Paola soils do not have a spodic horizon and are excessively drained. Pomello soils are somewhat poorly drained.

Typical pedon of Daytona sand, 0 to 5 percent slopes; on the Archbold Biological Station; 2,200 feet east and 2,100 feet north of the southwest corner, sec. 5, T. 38 S., R. 30 E.

A—0 to 3 inches; very dark gray (10YR 3/1) sand; single grained; loose; many fine and medium and few coarse roots; extremely acid; gradual wavy boundary.

E—3 to 36 inches; white (10YR 8/1) sand; single grained; loose; many fine and medium roots; strongly acid; abrupt wavy boundary.

Bh—36 to 45 inches; black (10YR 2/1) sand; weak fine subangular blocky structure; very friable; many fine and medium roots; very strongly acid; gradual wavy boundary.

BC—45 to 59 inches; brown (10YR 5/3) sand; single grained; loose; few fine and medium roots; very strongly acid; gradual wavy boundary.

C—59 to 80 inches; light gray (10YR 7/2) sand; few fine distinct brownish yellow (10YR 6/6) mottles; single grained; loose; few fine roots; very strongly acid.

Depth to the Bh horizon is 30 to 50 inches. The soil reaction ranges from medium acid to extremely acid. The texture below the A horizon is sand or fine sand.

The A horizon has hue of 10YR, value of 3 to 6, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1 or 2; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 2.

The BC horizon has hue of 10YR or 7.5YR, value of 4 or 5, and chroma of 3 to 6.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 3.

Duette Series

The Duette series consists of nearly level to gently sloping, moderately well drained, very droughty soils that formed in marine sand. These soils are on moderately high ridges in the ridge part of the county and on elevated ridges on the flatwoods. The slopes range from 0 to 5 percent. The soils of the Duette series are hyperthermic, Grossarenic Entic Haplohumods.

Duette soils are closely associated with Archbold, Astatula, Daytona, Paola, Pomello, and Satellite soils. Archbold and Satellite soils do not have a diagnostic horizon within 80 inches of the surface. Astatula and Paola soils are excessively drained and are in slightly

higher positions on the landscape than Duette soils. Daytona and Pomello soils have a spodic horizon between 30 and 50 inches.

Typical pedon of Duette sand, 0 to 5 percent slopes; approximately 1,000 feet east of the southwest corner, sec. 5, T. 38 S., R. 30 E.

A—0 to 6 inches; dark gray (10YR 4/1) sand; single grained; loose; few coarse and common medium and many fine and very fine roots; extremely acid; clear smooth boundary.

E1—6 to 18 inches; light gray (10YR 7/1) sand; single grained; loose; common medium and many fine and very fine roots; very strongly acid; gradual wavy boundary.

E2—18 to 51 inches; white (10YR 8/1) sand; single grained; loose; few medium and fine roots; very strongly acid; abrupt wavy boundary.

Bh—51 to 59 inches; dark reddish brown (5YR 3/2) sand; weak fine granular structure and about 15 percent weak fine subangular blocky structure; very friable; few medium roots; extremely acid; irregular wavy boundary.

BC—59 to 80 inches; mixed dark yellowish brown (10YR 3/4) and very pale brown (10YR 7/4) sand; single grained; loose; few medium roots; very strongly acid.

Depth to the Bh horizon is more than 50 inches. The soil reaction ranges from medium acid to extremely acid. The texture is sand or fine sand below the A horizon.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2.

Some pedons have a BE horizon that has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 1 to 3.

The BC horizon has hue of 10YR or 7.5YR, value of 3 to 7, and chroma of 2 to 4. Some pedons do not have a BC horizon.

Some pedons have a C horizon that has hue of 10YR, value of 5 or 6, and chroma of 2 to 4.

EauGallie Series

The EauGallie series consists of nearly level, poorly drained soils that formed in marine sediment. These soils are on broad flatwoods that are adjacent to sloughs and streams. The slopes range from 0 to 2 percent. The soils of the EauGallie series are sandy, siliceous, hyperthermic Alfic Haplaquods.

EauGallie soils are closely associated with Felda, Immokalee, Myakka, Oldsmar, Pomona, and Smyrna soils. Felda soils do not have a spodic horizon. Immokalee, Myakka, and Smyrna soils do not have an argillic horizon. Oldsmar soils have A and E horizons that are more than 30 inches thick. Pomona soils have low base saturation.

Typical pedon of EauGallie fine sand; on the Avon Park Air Force Range; 600 feet north and 2,600 feet west of the southeast corner, sec. 8, T. 33 S., R. 30 E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) fine sand, rubbed; weak fine granular structure; very friable; common medium and many fine roots; very strongly acid; gradual wavy boundary.

E1—4 to 16 inches; gray (10YR 5/1) fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

E2—16 to 26 inches; light gray (10YR 7/1) fine sand; single grained; loose; strongly acid; abrupt wavy boundary.

Bh1—26 to 33 inches; black (5YR 2/1) fine sand; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bh2—33 to 40 inches; dark reddish brown (5YR 3/2) fine sand; many medium faint reddish brown mottles; weak fine subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Btg—40 to 53 inches; light brownish gray (10YR 6/2) sandy clay loam; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

BCg—53 to 80 inches; light brownish gray (10YR 6/2) fine sandy loam; weak fine subangular blocky structure; friable; very strongly acid.

The soil reaction ranges from very strongly acid to medium acid in the A and E horizons, from very strongly acid to slightly acid in the Bh horizon, and from very strongly acid to mildly alkaline in the Btg and BCg horizons.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Bh horizon has hue of 5YR or 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral (N) and has value of 2. The texture is sand or fine sand.

Some pedons have an E′ horizon that has hue of 10YR, value of 4 to 6, and chroma of 1 to 3. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, 5Y, or 2.5Y, value of 5 to 7, and chroma of 1 or 2. The texture is sandy loam, fine sandy loam, or sandy clay loam.

Felda Series

The Felda series consists of nearly level, poorly drained and very poorly drained soils that formed in sandy and loamy marine sediment. These soils are in large drainageways and depressions and on low flats in the flatwoods part of the county. The slopes range from 0 to 2 percent. The soils of the Felda series are loamy, siliceous, hyperthermic Arenic Ochraqualfs.

Felda soils are closely associated with Bradenton, Malabar, Pineda, Tequesta, and Valkaria soils. Bradenton soils have an argillic horizon within 20 inches of the surface. Malabar, Pineda, and Valkaria soils have a Bw horizon. Tequesta soils have an organic surface layer.

Typical pedon of Felda fine sand; approximately 300 feet east and 200 feet north of the southwest corner, sec. 32, T. 37 S., R. 32 E.

Ap—0 to 7 inches; gray (10YR 5/1) fine sand; single grained; loose; many fine and very fine roots; very strongly acid; clear wavy boundary.

Eg1—7 to 14 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine and very fine roots; very strongly acid; gradual wavy boundary.

Eg2—14 to 21 inches; light gray (10YR 7/2) fine sand; single grained; loose; strongly acid; clear wavy boundary.

Eg3—21 to 24 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

Btg—24 to 36 inches; gray (5Y 6/1) very fine sandy loam; common medium prominent brownish yellow (10YR 6/8) mottles; moderate medium subangular blocky structure; friable; few pockets and lenses of calcium carbonate nodules in lower part of horizon; medium acid; gradual wavy boundary.

Cg1—36 to 68 inches; light gray (10YR 7/2) fine sand; many medium and few coarse prominent brownish yellow (10YR 6/8) mottles; single grained; loose; few pockets and lenses of calcium carbonate nodules; mildly alkaline; gradual wavy boundary.

Cg2—68 to 80 inches; dark grayish brown (10YR 4/2) fine sand; few medium prominent brownish yellow (10YR 6/8) mottles; single grained; loose; few pockets and lenses of calcium carbonate nodules; mildly alkaline.

The thickness of the solum ranges from 30 to 60 inches.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1. The soil reaction ranges from very strongly acid to neutral.

The Eg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The soil reaction ranges from very strongly acid to neutral. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; hue of 5Y, value of 6, and chroma of 1; or hue of 2.5Y, value of 6, and chroma of 2. This horizon has mottles in shades of brown, yellow, and red. The reaction ranges from slightly acid to mildly alkaline. The texture is sandy loam, very fine sandy loam, fine sandy loam, or sandy clay loam.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2; or hue of 5GY, value of 6, and chroma of 1. The reaction is slightly acid to moderately alkaline. The texture is sand, fine sand, or loamy sand. Shell fragments are in some pedons.

Gator Series

The Gator series consists of nearly level, very poorly drained, organic soils that formed in moderately thick deposits of sapric material underlain by loamy mineral layers. These soils are in marshes, swamps, and depressional areas throughout the county. The slopes range from 0 to 1 percent. The soils of the Gator series are loamy, siliceous, euic, hyperthermic Terric Medisaprists.

Gator soils are closely associated with Chobee, Felda, Hicoria, and Tequesta soils. The associated soils are mineral soils, and in addition, Tequesta soils have a histic epipedon.

Typical pedon of Gator muck; in a drained area of improved pasture, northwest side of intersection of two spoil banks on Buck Island Ranch; 2,900 feet east and 1,000 feet north of the southwest corner, sec. 28, T. 38 S., R. 31 E.

Oa—0 to 18 inches; black (5YR 2/1) muck; about 1 percent rubbed fiber; moderate medium granular structure; friable; dark grayish brown (10YR 4/2) sodium pyrophosphate extract; many very fine and fine roots in upper 6 inches and common fine roots

below 6 inches; medium acid; (pH 5.85 in 0.01 molar calcium chloride solution); gradual wavy boundary.

Cg1—18 to 36 inches; very dark gray (10YR 3/1) sandy clay loam; massive; slightly sticky and plastic; neutral; gradual wavy boundary.

Cg2—36 to 55 inches; dark grayish brown (10YR 4/2); stratified sandy loam and loamy sand; massive; nonsticky and nonplastic; neutral; gradual wavy boundary.

Cg3—55 to 80 inches; mixed dark gray and gray (10YR 4/1, 5/1) sand; single grained; nonsticky and nonplastic; neutral.

The thickness of the organic material ranges from 16 to 40 inches. The organic material has pH value of 4.5 or more in 0.01 molar calcium chloride solution and has a pH range of 6.5 to 7.5 by the Hellige-Truog method. The underlying mineral material is slightly acid to moderately alkaline.

The Oa horizon has hue of 10YR, value of 2, and chroma of 2 or less; or hue of 5YR, value of 2, and chroma of 2 or less.

The Cg1 and Cg2 horizons have hue of 10YR, value of 2 to 4, and chroma of 1 or 2. The texture is sandy clay loam or sandy loam. The Cg2 horizon includes stratified loamy sand, loamy fine sand, or sandy loam.

The Cg3 horizon has hue of 10YR, value of 4 to 6, and chroma of 2 or less. The texture is sand or fine sand.

Hicoria Series

The Hicoria series consists of nearly level, very poorly drained soils that formed in thick beds of loamy marine sediment. These soils are in depressional areas on the flatwoods and along the edges of swamps and marshes in the county. The slopes range from 0 to 2 percent. The soils of the Hicoria series are loamy, siliceous, hyperthermic Typic Umbraqualfs.

Hicoria soils are closely associated with Basinger, Chobee, Felda, Kaliga, and Tequesta soils. Basinger soils do not have an umbric epipedon or argillic horizon. Chobee soils have a mollic epipedon. Felda soils do not have an umbric epipedon. Kaliga soils are organic. Tequesta soils have a histic epipedon.

Typical pedon of Hicoria mucky sand, depressional; in a flatwoods pond; 2,625 feet south and 875 feet east of the northwest corner, sec. 12, T. 28 S., R. 31 E.

A1—0 to 4 inches; black (N 2/0) mucky sand; weak coarse granular structure; friable; many fine roots; extremely acid; gradual wavy boundary.

A2—4 to 15 inches; black (N 2/0) sand; weak fine granular structure; very friable; many fine roots; extremely acid; gradual wavy boundary.

Eg—15 to 21 inches; light gray (10YR 7/1) sand; single grained; loose; many fine roots; extremely acid; clear smooth boundary.

Btg1—21 to 39 inches; dark gray (N 4/0) fine sandy loam; common medium distinct dark yellowish brown (10YR 5/6) mottles; weak fine subangular blocky structure; friable; streaks and lenses of sandy clay loam; many fine roots; extremely acid; gradual wavy boundary.

Btg2—39 to 52 inches; grayish brown (2.5Y 5/2) fine sandy loam; common medium distinct dark yellowish brown (10YR 4/6) mottles; weak fine subangular blocky structure; friable; streaks and lenses of sandy clay loam; many fine roots; extremely acid; gradual wavy boundary.

BCg—52 to 80 inches; dark gray (5Y 4/1) fine sandy loam; weak coarse subangular blocky structure; friable; extremely acid.

The soil reaction ranges from extremely acid to slightly acid in the A horizon and from extremely acid to neutral in the E, B, and C horizons.

The A horizon has hue of 10YR or 7.5YR, value of 1 to 3, and chroma of 1 or 2; or it is neutral (N) and has value of 2. The texture is sand, fine sand, mucky fine sand, mucky sand, loamy sand, or loamy fine sand.

The Eg horizon has hue of 10YR or 2.5Y, value of 4 to 7, and chroma of 1 or 2. The texture is sand, fine sand, loamy sand, or loamy fine sand. Some pedons are mottled in shades of gray, yellow, and brown.

The Btg horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2; hue of 2.5Y, value of 5, and chroma of 2; or it is neutral (N) and has value of 4 to 7. This horizon has mottles in shades of gray, yellow, and brown. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The BCg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2; or hue of 5Y, value of 4, and chroma of 1. The texture is fine sandy loam, sandy loam, or sandy clay loam.

Some pedons have a sandy Cg horizon.

Hontoon Series

The Hontoon series consists of nearly level, very poorly drained, organic soils that formed in moderately thick beds of hydrophytic nonwoody plant remains. These soils are in marshes and swamps throughout the

county. The slopes range from 0 to 1 percent. The soils of the Hontoon series are dysic, hyperthermic Typic Medisaprists.

Hontoon soils are closely associated with Basinger, Placid, Samsula, and Satellite soils. Basinger, Placid, and Satellite soils are mineral soils. Samsula soils have organic materials less than 51 inches thick.

Typical pedon of Hontoon muck; in a blackgum swamp; 2,500 feet east and 2,000 feet north of the southwest corner, sec. 7, T. 37 S., R. 30 E.

Oa1—0 to 15 inches; dark reddish brown (5YR 2/2) muck; 15 percent unrubbed and less than 1 percent rubbed; massive; slightly sticky and nonplastic; dark brown (10YR 4/3) sodium pyrophosphate extract; many fine and common medium roots; extremely acid; (3.65 in calcium chloride); clear smooth boundary.

Oa2—15 to 65 inches; black (N 2/0) muck; 10 percent unrubbed and less than 1 percent rubbed; massive; slightly sticky and slightly plastic; dark brown (10YR 4/3) sodium pyrophosphate extract; few fine roots; extremely acid; (pH 3.85 in calcium chloride); clear wavy boundary.

C—65 to 73 inches; black (N 2/0) mucky sand; massive; slightly sticky and nonplastic; extremely acid; gradual wavy boundary.

Cg—73 to 80 inches; dark gray (10YR 4/1) sand; single grained; nonsticky and nonplastic; very strongly acid.

The thickness of the organic material extends to a depth of more than 51 inches. The organic material has pH value of less than 4.5 in calcium chloride solution and a pH range of 4.0 to 6.0 by the Hellige-Truog method. In some pedons, the underlying mineral material is very strongly acid or strongly acid.

The Oa horizon has hue of 5YR, 7.5YR, 10YR, value of 2, and chroma of 1 or 2; or it is neutral (N) and has value of 2. The unrubbed fiber content ranges from 5 to 30 percent. The rubbed fiber content ranges from 5 percent to less than 1 percent. Sodium pyrophosphate extract in the Oa horizon has hue of 10YR, value of 2 to 4, and chroma of 4 or less.

The C or Cg horizon has hue of 10YR, value of 2 to 6, and chroma of 1 or 2; or it is neutral (N) and has value of 2. The texture is dominantly sand or fine sand including the mucky modifier but ranges from sand or fine sand to a loamy material in some pedons. Some pedons do not have a C or Cg horizon.

Immokalee Series

The Immokalee series consists of nearly level, poorly drained soils that formed in sandy marine sediment. These soils are in broad areas on the flatwoods and lower elevations in the ridge part of the county. The slopes range from 0 to 2 percent. The soils of the Immokalee series are sandy, siliceous, hyperthermic Arenic Haplaquods.

Immokalee soils are closely associated with Basinger, Felda, Myakka, Pomello, Satellite, and Smyrna soils. Basinger soils are in lower positions than Immokalee soils and do not have a spodic horizon. Felda soils have an argillic horizon. Myakka and Smyrna soils have a spodic horizon less than 30 inches from the surface. Pomello and Satellite soils are better drained than Immokalee soils; and, in addition, Satellite soils do not have a diagnostic horizon within 80 inches of the surface.

Typical pedon of Immokalee sand; on Buck Island Ranch; approximately 1,700 feet west and 3,200 feet north of the southeast corner, sec. 10, T. 38 S., R. 31 E.

Ap—0 to 6 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; common medium and fine roots; very strongly acid; clear smooth boundary.

E1—6 to 14 inches; gray (10YR 5/1) sand; single grained; loose; common medium and fine roots; medium acid; gradual wavy boundary.

E2—14 to 37 inches; white (10YR 8/1) sand; single grained; loose; few fine roots; medium acid; abrupt smooth boundary.

Bh1—37 to 60 inches; black (7.5YR 2/0) sand; massive; firm; extremely acid; gradual smooth boundary.

Bh2—60 to 80 inches; black (10YR 2/1) fine sand; massive; firm; extremely acid.

The soil reaction ranges from medium acid to extremely acid. The texture below the A horizon is sand or fine sand.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; hue of 5YR, value of 2, and chroma of 1 or 2; or hue of 7.5YR, value of 3, and chroma of 2.

Some pedons have a B/C horizon that has hue of 10YR, value of 3 to 5, and chroma of 3 or 4.

Some pedons have a C horizon that has hue of 10YR, value of 4 to 6, and chroma of 1 or 2.

Kaliga Series

The Kaliga series consists of nearly level, very poorly drained, organic soils that formed in moderately thick deposits of sapric material underlain by loamy mineral layers. These soils are in depressional areas and in large swamps and marshes throughout the county. The slopes range from 0 to 1 percent. The soils of the Kaliga series are loamy, siliceous, dysic, hyperthermic Terric Medisaprists.

Kaliga soils are closely associated with Basinger, Felda, Hicoria, Hontoon, Placid, and Samsula soils. Basinger, Felda, Hicoria, and Placid soils are mineral soils. Hontoon soils have thicker deposits of organic material than Kaliga soils. Samsula soils are underlain by sandy material.

Typical pedon of Kaliga muck; in a drained area of improved pasture; 500 feet west and 1,000 feet south of the northeast corner, sec. 23, T. 37 S., R. 31 E.

Op—0 to 6 inches; black (10YR 2/1) muck; about 3 percent rubbed fiber; weak medium subangular blocky structure; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; common fine roots; extremely acid; (pH 4.0 in 0.01 molar calcium chloride solution); gradual wavy boundary.

Oa—6 to 39 inches; dark brown (7.5YR 3/2) muck; about 3 percent rubbed fiber; weak medium subangular blocky structure; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; few fine roots; extremely acid; (pH 3.5 in 0.01 molar calcium chloride solution); abrupt wavy boundary.

Cg1—39 to 45 inches; grayish brown (10YR 5/2) very fine sand; single grained; loose; very strongly acid; gradual wavy boundary.

Cg2—45 to 68 inches; dark gray (10YR 4/1) very fine sandy loam; pockets and lenses or light brownish gray (10YR 6/2) sand; weak medium subangular blocky structure; slightly sticky and slightly plastic; strongly acid; gradual wavy boundary.

Cg3—68 to 80 inches; grayish brown (10YR 5/2) very fine sand; single grained; loose; medium acid.

The thickness of the organic material ranges from 16 to 40 inches. Some pedons have organic material at a depth of slightly more than 40 inches. The organic material has pH value of less than 4.5 in 0.01 molar calcium chloride solution and has a pH range of 4.0 to 6.0 by the Hellige-Truog method. The underlying mineral material is neutral to very strongly acid.

The Oa or Op horizon has hue of 10YR, value of 2, and chroma of 1; hue of 7.5YR, value of 3, and chroma of 2; or hue of 5YR, value of 2 or 3, and chroma of 1 to 3.

The Cg horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2. The texture is very fine sand, loamy fine sand, or fine sandy loam in the upper part, very fine sandy loam, sandy clay loam, sandy clay, or clay in the middle part, and very fine sand, loamy sand, fine sandy loam, or sandy loam in the lower part. The weighted clay content averages 10 to 35 percent in the upper 12 inches of the Cg horizon or at a depth of less than 51 inches, whichever is thickest.

Malabar Series

The Malabar series consists of nearly level, poorly drained and very poorly drained soils that formed in sandy and loamy marine sediment. These soils are in narrow to broad sloughs, poorly defined drainageways, and depressions on the flatwoods part of the county. The slopes range from 0 to 2 percent. The soils of the Malabar series are loamy, siliceous, hyperthermic, Grossarenic Ochraqualfs.

Malabar soils are closely associated with Basinger, Felda, Myakka, Pineda, Smyrna, and Valkaria soils. Basinger, Myakka, Smyrna, and Valkaria soils do not have an argillic horizon. Felda and Pineda soils have an argillic horizon between depths of 20 to 40 inches.

Typical pedon of Malabar fine sand; on Darroh Ranch; 1,400 feet east and 2,000 feet south of northwest corner, sec. 12, T. 38 S., R. 31 E.

Ap—0 to 4 inches; dark gray (10YR 4/1) fine sand; many clean sand grains; weak fine granular structure; very friable; many very fine and fine roots; slightly acid; clear smooth boundary.

E—4 to 14 inches; light gray (10YR 7/2) fine sand; single grained; loose; medium acid; clear smooth boundary.

Bw1—14 to 30 inches; yellow (10YR 7/6) fine sand; few medium distinct brownish yellow (10YR 6/8) mottles; single grained; loose; medium acid; gradual wavy boundary.

Bw2—30 to 37 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; medium acid; clear wavy boundary.

Bw3—37 to 44 inches; light yellowish brown (10YR 6/4) fine sand; common medium distinct strong brown

(7.5YR 4/6) iron concretions; single grained; loose; medium acid; clear wavy boundary.

Bw4—44 to 48 inches; yellowish brown (10YR 5/6) fine sand; single grained; loose; strongly acid; gradual wavy boundary.

Btg—48 to 80 inches; greenish gray (5GY 5/1) fine sandy loam; common medium prominent light olive brown (2.5Y 5/6) mottles and few fine faint yellowish brown mottles; moderate medium subangular blocky structure; friable; strongly acid.

The thickness of the solum ranges from 50 to 80 inches. The soil reaction ranges from strongly acid to moderately alkaline.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Bw horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8; or hue of 7.5YR, value of 5, and chroma of 6 to 8. The texture is sand or fine sand.

Some pedons have an E' horizon that has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 4 to 7, and chroma of 1; or hue of 5Y, value of 5 or 6, and chroma of 1. This horizon has mottles in shades of red, yellow, and brown. The texture is sandy loam, fine sandy loam, or sandy clay loam. In many pedons, this horizon has lenses and pockets of a coarser material.

Some pedons have a C horizon that has hue of 10YR, value of 5 or 6, and chroma of 1 or 2; or hue of 5Y, value of 5 or 6, and chroma of 1. The texture is sand or fine sand, and this horizon can have pockets or lenses of a loamy material.

Myakka Series

The Myakka series consists of nearly level, poorly drained soils that formed in deposits of thick marine sediment. These soils are in the low, broad, flatwood areas in the county. The slopes range from 0 to 2 percent. The soils of the Myakka series are sandy, siliceous, hyperthermic Aeric Haplaquods.

Myakka soils are closely associated with Basinger, Immokalee, Satellite, Smyrna, and Valkaria soils. Basinger soils are in slightly lower positions on the landscape than Myakka soils and do not have a spodic horizon. Immokalee soils have a spodic horizon between depths of 30 to 50 inches. Satellite soils do not have a diagnostic horizon and are better drained than Myakka soils. Smyrna soils have a spodic horizon less than 20 inches from the surface. Valkaria soils do not have a spodic horizon and have higher chromas than Myakka soils.

Typical pedon of Myakka fine sand; near Harney Pond Canal; approximately 2,100 feet south and 100 feet east of the northwest corner, sec. 10, T. 30 S., R. 31 E.

Ap—0 to 4 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; many very fine and fine roots; very strongly acid; clear smooth boundary.

E—4 to 24 inches; light gray (10YR 7/1) and light brownish gray (10YR 6/2) sand; single grained; loose; very strongly acid; abrupt smooth boundary.

Bh1—24 to 43 inches; black (5YR 2/1) sand; moderate medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

Bh2—43 to 58 inches; dark brown (7.5YR 3/2) sand; common medium faint black (5YR 2/1) mottles; massive; loose; very strongly acid; gradual wavy boundary.

BC—58 to 80 inches; dark brown (10YR 3/3) sand; single grained; loose; very strongly acid.

The soil reaction ranges from slightly acid to very strongly acid. The texture below the A horizon is sand or fine sand.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3.

The BC horizon has hue of 10YR, value of 4 or 5, and chroma of 3 or 4.

Some horizons have a C horizon that has hue of 10YR, value of 4 to 7, and chroma of 1 to 4.

Oldsmar Series

The Oldsmar series consists of nearly level, poorly drained soils that formed in marine sediment. These soils are mainly in broad, flatwood areas that are adjacent to sloughs and streams. The slopes range from 0 to 2 percent. The soils of the Oldsmar series are sandy, siliceous, hyperthermic Alfic Arenic Haplaquods.

Oldsmar soils are closely associated with EauGallie, Felda, Immokalee, Myakka, and Smyrna soils. EauGallie soils are on the same landscape as Oldsmar soils but have a spodic horizon within 30 inches of the surface. Felda soils have an argillic horizon between

depths of 20 to 40 inches. Immokalee, Myakka, and Smyrna soils have a spodic horizon but do not have an argillic horizon.

Typical pedon of Oldsmar fine sand; near Graham Dairy Road; approximately 1,800 feet south and 2,400 feet west of the northeast corner, sec. 11, T. 39 S., R. 28 E.

Ap—0 to 4 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; neutral; gradual wavy boundary.

E1—4 to 12 inches; gray (10YR 6/1) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

E2—12 to 32 inches; light gray (10YR 7/2) fine sand; single grained; loose; slightly acid; clear wavy boundary.

Bh1—32 to 35 inches; black (10YR 2/1) fine sand; weak fine granular structure; very friable; medium acid; gradual wavy boundary.

Bh2—35 to 45 inches; dark brown (10YR 3/2) fine sand; weak fine granular structure; very friable; strongly acid; gradual wavy boundary.

Bh3—45 to 54 inches; brown (7.5YR 4/2) fine sand; weak fine granular structure; loose; slightly acid; clear wavy boundary.

Btg—54 to 60 inches; grayish brown (2.5Y 5/2) sandy clay loam; weak medium subangular blocky structure; friable; neutral; gradual wavy boundary.

C—60 to 80 inches; yellowish brown (10YR 5/4) fine sand; single grained; loose; neutral.

The soil reaction ranges from neutral to extremely acid in the A and Bh horizons. It ranges from slightly acid to moderately alkaline in the Bt and C horizons. The texture of the A, E, Bh, and C horizons is sand or fine sand. The texture of the Bt horizon is sandy loam, fine sandy loam, or sandy clay loam.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2.

The Bh horizon has hue of 10YR or 5YR, value of 2 or 3, and chroma of 1 to 3; or hue of 7.5YR, value of 3 or 4, and chroma of 2.

The Bt horizon has hue of 2.5Y, value of 4 to 7, and chroma of 1 to 4; hue of 10YR, value of 4 to 6, and chroma of 1 to 3; or hue of 5GY, value of 5 or 6, and chroma of 1.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 2 to 4; or hue of 5Y, value of 5, and chroma of 1. Some pedons do not have a C horizon.

Orsino Series

The Orsino series consists of nearly level to gently sloping, moderately well drained, droughty soils that formed in marine and eolian deposits. These soils are on moderately high ridges in the ridge part of the county. The slopes range from 0 to 5 percent. The soils of the Orsino series are hyperthermic, uncoated Spodic Quartzipsamments.

Orsino soils are closely associated with Archbold, Astatula, Duette, Paola, Pomello, St. Lucie, and Tavares soils. Archbold and St. Lucie soils do not have a diagnostic horizon within 80 inches of the surface. Astatula and Paola soils are excessively drained and are in slightly higher positions on the landscape than Orsino soils. Duette and Pomello soils have a spodic horizon. Tavares soils do not have an E horizon.

Typical pedon of Orsino sand, 0 to 5 percent slopes; on the Archbold Biological Station; approximately 2,000 feet west and 2,600 feet north of the southeast corner, sec. 5, T. 38 S., R. 30 E.

A—0 to 2 inches; gray (10YR 5/1) sand; single grained; loose; many fine and medium roots; very strongly acid; gradual wavy boundary.

E—2 to 46 inches; white (10YR 8/1) sand; single grained; loose; many fine and medium roots; strongly acid; abrupt irregular boundary.

Bw/Bh—46 to 66 inches; yellowish brown (10YR 5/4) sand (Bw), discontinuous lenses of reddish brown (5YR 4/3) sand (Bh), and dark reddish brown (5YR 3/4) sand (Bh); weak fine subangular blocky structure and weak fine granular structure; very friable; few fine and medium roots; very strongly acid; abrupt irregular boundary.

C2—66 to 80 inches; very pale brown (10YR 7/4) sand; single grained; loose; few fine and medium roots; strongly acid.

The soil reaction ranges from medium acid to extremely acid. Below the surface, the texture ranges from sand to fine sand to a depth of 80 inches or more. Silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1.

The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2.

The Bw part of the Bw&Bh horizon has hue of 10YR, value of 5 or 6, and chroma of 4 to 8. The Bh part has hue of 10YR, value of 3, and chroma of 2; hue of 5YR, value of 4, and chroma of 3; or hue of 5YR, value of 3,

and chroma of 2 to 4. Tongues of the E horizon extend into and throughout the B horizon.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4; or hue of 10YR, value of 8, and chroma of 1 to 3. In some pedons, the C horizon has mottles in shades of red and yellow. Some pedons have many uncoated sand grains and small pockets and lenses of white sand.

Paola Series

The Paola series consists of nearly level to moderately sloping, excessively drained, droughty soils that formed in marine or eolian deposits. These soils are on high sandy ridges in the ridge part of the county. The slopes range from 0 to 12 percent. The soils of the Paola series are hyperthermic, uncoated Spodic Quartzipsamments.

Paola soils are closely associated with Astatula, Duette, Orsino, Pomello, St. Lucie, and Tavares soils. Astatula and Tavares soils do not have an albic horizon. Duette and Pomello soils have a spodic horizon. Orsino soils have a water table between 40 inches and 80 inches. St. Lucie soils do not have a diagnostic horizon within 80 inches of the surface.

Typical pedon of Paola sand, 0 to 8 percent slopes; on the Archbold Biological Station; 1,700 feet west and 1,500 feet south of the northeast corner, sec. 8, R. 30 E., T. 38 S.

Ap—0 to 5 inches; gray (10YR 5/1) sand; single grained; loose; many fine and medium roots; strongly acid; clear smooth boundary.

E—5 to 17 inches; light gray (10YR 7/1) sand; single grained; loose; many fine and medium roots; medium acid; gradual wavy boundary.

Bw—17 to 27 inches; very pale brown (10YR 7/4) and yellowish brown (10YR 5/6) sand; single grained; loose; many fine and medium roots; strongly acid; gradual wavy boundary.

C1—27 to 42 inches; yellowish brown (10YR 5/6) sand; single grained; loose; few fine roots; strongly acid; diffuse boundary.

C2—42 to 80 inches; yellow (10YR 7/6) sand; single grained; loose; few fine roots; strongly acid.

The soil reaction ranges from extremely acid to neutral. The texture is sand or fine sand. Silt plus clay in the 10- to 40-inch control section is less than 5 percent.

The A horizon has hue of 10YR, value of 4 to 6, and chroma of 1.

The E horizon has hue of 10YR, value of 7 or 8, and chroma of 1.

The Bw horizon has hue of 10YR, value of 5 to 7, and chroma of 4 to 8. Some pedons have tongues of E horizon material extending into the Bw horizon. Where tongues are prominent, Bh bodies are common between the E and Bw horizons.

The C horizon has hue of 10YR, value of 6 or 7, and chroma of 3 or 4.

Pineda Series

The Pineda series consists of nearly level, poorly drained soils that formed in sandy and loamy marine sediment. These soils are on broad, low flats, in sloughs and large, poorly defined drainageways in the flatwoods part of the county. The slopes range from 0 to 2 percent. The soils of the Pineda series are loamy, siliceous, hyperthermic Arenic Glossaqualfs.

Pineda soils are closely associated with Basinger, Felda, Malabar, Myakka, Smyrna, and Valkaria soils. Basinger, Myakka, Smyrna, and Valkaria soils do not have an argillic horizon. Felda soils do not have a Bw horizon, and Malabar soils have an argillic horizon at a depth or more than 40 inches.

Typical pedon of Pineda sand; 2,000 feet east and 1,700 feet south of the northwest corner, sec. 33, T. 38 S., R. 31 E.

A—0 to 4 inches; dark gray (10YR 4/1) sand; weak fine granular structure; very friable; many fine and few medium roots; strongly acid; clear smooth boundary.

E—4 to 12 inches; light gray (10YR 7/1) sand; single grained; loose; few fine roots; medium acid; abrupt wavy boundary.

Bw—12 to 30 inches; brownish yellow (10YR 6/8) sand; single grained; loose; medium acid; gradual wavy boundary.

Btg1—30 to 50 inches; light brownish gray (10YR 6/2) sandy clay loam; few fine distinct yellowish brown (10YR 5/4) mottles and common medium prominent yellowish red (5YR 5/6) mottles; weak medium subangular blocky structure; firm; a few small tongues of light gray (10YR 7/1) fine sand in upper 5 inches; slightly acid; gradual wavy boundary.

Btg2—50 to 56 inches; light brownish gray (10YR 6/2) sandy loam; common medium prominent yellowish red (5YR 5/6) mottles; massive; friable; slightly acid; gradual wavy boundary.

Cg1—56 to 63 inches; brown (7.5YR 5/2) sand; few fine prominent yellowish red (5YR 5/6) mottles; single

grained; loose; neutral; gradual wavy boundary.

Cg2—63 to 80 inches; light greenish gray (5GY 7/1) sand; single grained; loose; moderately alkaline.

The thickness of the solum is 40 to 80 inches. The soil reaction ranges from strongly acid to neutral in the A, E, and Bw horizons, from strongly acid to moderately alkaline in the Bt horizon, and from medium acid to moderately alkaline in the C horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or hue of 10YR, value of 4, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 5 to 8, and chroma of 1 or 2. The texture is sand or fine sand.

The Bw horizon has hue of 10YR, value of 6 or 7, and chroma of 6 or 8. The texture is sand or fine sand.

The Btg horizon has hue of 10YR or 5GY, value of 5 to 7, and chroma of 1 or 2. This horizon has mottles in shades of red, yellow, and brown. In some pedons, the horizon contains small bodies of iron concretions. The texture is sandy clay loam, sandy loam, or fine sandy loam.

The Cg horizon has hue of 10YR or 5GY, value of 5 to 8, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand.

Placid Series

The Placid series consists of nearly level, very poorly drained soils that formed in sandy marine sediment. These soils are in depressional areas on the flatwoods and along the edges of swamps and marshes in the county. The slopes range from 0 to 2 percent. The soils of the Placid series are sandy, siliceous, hyperthermic Typic Humaquepts.

Placid soils are closely associated with Basinger, Immokalee, Myakka, Samsula, Smyrna, and Valkaria soils. Basinger soils do not have an umbric epipedon and have layers of organic staining. Immokalee, Myakka, and Smyrna soils are better drained than Placid soils and have a spodic horizon. Samsula soils are organic soils. Valkaria soils do not have an umbric epipedon and have higher chromas than Placid soils.

Typical pedon of Placid fine sand, depressional; on the Avon Park Air Force Range; approximately 50 feet south and 2,000 feet east of the northwest corner, sec. 1, T. 34 S., R. 30 E.

A1—0 to 3 inches; black (N/2) fine sand; lenses and pockets of mucky fine sand; weak fine granular structure; very friable; many fine and medium roots; extremely acid; clear wavy boundary.

A2—3 to 11 inches; very dark gray (10YR 3/1) fine sand; weak fine granular structure; very friable; few fine and medium roots; very strongly acid; gradual wavy boundary.

Cg1—11 to 38 inches; light brownish gray (10YR 6/2) fine sand; few medium distinct very dark gray (10YR 3/1) mottles; single grained; loose; slightly acid; gradual wavy boundary.

Cg2—38 to 49 inches; dark grayish brown (10YR 4/2) fine sand; single grained; loose; nonsticky and nonplastic; medium acid; gradual wavy boundary.

Cg3—49 to 57 inches; light brownish gray (10YR 6/2) fine sand; common medium faint brown (10YR 5/3) mottles; single grained; nonsticky and nonplastic; slightly acid; gradual wavy boundary.

Cg4—57 to 80 inches; dark grayish brown (10YR 4/2) fine sand; single grained; nonsticky and nonplastic; medium acid.

The soil reaction is extremely acid to strongly acid in the A horizon and is extremely acid to slightly acid in the Cg horizon.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1; or it is neutral (N) and has value of 2.

The Cg horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. Some pedons have few to common mottles of yellow and brown.

Pomello Series

The Pomello series consists of nearly level to gently sloping, moderately well drained, droughty soils that formed in marine sand. These soils are mostly on elevated ridges and knolls in the flatwoods part of the county. The slopes range from 0 to 5 percent but are dominantly 0 to 3 percent. The soils of the Pomello series are sandy, siliceous hyperthermic, Arenic Haplohumods.

These soils are taxadjuncts to the Pomello series because the Bh horizon is slightly deeper (below 50 inches) than allowed in the series. Because of the high inclusions of soils in the Pomello range of characteristics, such as the Bh horizon between depths of 30 and 50 inches, closely similar physical characteristics, and positions on the landscape, there is little or no difference in use and management of these soils.

Pomello soils are closely associated with Immokalee, Myakka, Satellite, and Smyrna soils. Immokalee soils are poorly drained. Myakka and Smyrna soils have a Bh horizon within 30 inches of the surface and are poorly drained. Satellite soils do not have a diagnostic horizon

within 80 inches of the surface and are somewhat poorly drained.

Typical pedon of Pomello sand, 0 to 5 percent slopes; on the Avon Park Air Force Range; 250 feet north and 2,900 feet east of the southwest corner, sec. 6, T. 34 S., R. 31 E.

A—0 to 4 inches; dark gray (10YR 4/1) sand, rubbed; single grained; loose; many fine and common medium roots; strongly acid; clear smooth boundary.

E—4 to 56 inches; white (10YR 8/1) sand; single grained; loose; many medium and common fine roots in upper 10 inches; few medium distinct dark grayish brown and black (10YR 4/2, 2/1) mottles that occur as staining along old root channels; strongly acid; abrupt wavy boundary.

Bh—56 to 62 inches; mixed dark brown (7.5YR 3/2) and dark reddish brown (5YR 3/2) sand; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

BC—62 to 80 inches; brown (10YR 4/3) sand; single grained; loose; common medium distinct dark brown (7.5YR 3/2) mottles; medium acid.

The soil reaction ranges from very strongly acid to medium acid. The texture is sand or fine sand below the A horizon.

The A horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2.

The E horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Streaks and staining of hue of 10YR, value of 2 to 4, and chroma of 1 or 2 are along old root channels.

The Bh horizon has hue of 10YR to 5YR, value of 2 or 3, and chroma of 1 to 3.

The BC horizon has hue of 10YR, value of 3 or 4, and chroma of 3. Some pedons do not have a BC horizon.

Some pedons have a C horizon that has hue of 10YR, value of 5 to 7, and chroma of 1.

Pomona Series

The Pomona series consists of nearly level, poorly drained soils that formed in marine sediment. These soils are on the flatwoods that are adjacent to seep areas that are along the western, downslope edge of the ridge in the northern half of the county. The slopes range from 0 to 2 percent. The soils of the Pomona series are sandy, siliceous, hyperthermic Ultic Haplaquods.

Pomona soils are closely associated with Basinger, EauGallie, Myakka, Placid, Smyrna, and Valkaria soils. Basinger, Myakka, Placid, Smyrna, and Valkaria soils do not have an argillic horizon. EauGallie soils have high base saturation.

Typical pedon of Pomona sand; 2,100 feet north of the southwest corner, sec. 6, T. 34 S., R. 28 E.

A—0 to 6 inches; black (10YR 2/1) sand; weak fine granular structure; very friable; common fine and very fine roots; very strongly acid; clear smooth boundary.

E1—6 to 14 inches; gray (10YR 5/1) sand; single grained; nonsticky and nonplastic; common fine and few medium roots; very strongly acid; clear wavy boundary.

E2—14 to 29 inches; light gray (10YR 7/1) sand; single grained; nonsticky and nonplastic; very strongly acid; abrupt smooth boundary.

Bh1—29 to 37 inches; dark brown (7.5YR 3/2) sand; massive; nonsticky and nonplastic; very strongly acid; gradual wavy boundary.

Bh2—37 to 51 inches; very dark grayish brown (10YR 3/2) sand; massive; nonsticky and nonplastic; very strongly acid; gradual wavy boundary.

E'—51 to 61 inches; light brownish gray (10YR 6/2) sand; single grained; nonsticky and nonplastic; strongly acid; gradual wavy boundary.

Btg—61 to 80 inches; gray (5Y 6/1 and 5Y 5/1) sandy loam; weak medium subangular blocky structure; nonsticky and nonplastic; strongly acid.

The thickness of the solum is 60 or more inches. The soil reaction ranges from extremely acid to strongly acid except where lime has been added to the soil.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand.

The Bh horizon has hue of 10YR or 7.5YR, value of 2 or 3, and chroma of 1 or 2. The texture is sand or fine sand.

The E' horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2. The texture is sand or fine sand. Some pedons do not have an E' horizon.

The Btg horizon has hue of 10YR or 5Y, value of 5 to 7, and chroma of 1 or 2. In some pedons, the Btg horizon has mottles in shades of brown, red, or

yellow. The texture is sandy loam or sandy clay loam.

St. Johns Series

The St. Johns series consists of nearly level to gently sloping, poorly drained soils that formed in thick, sandy marine deposits. These soils are on seepy side slopes between ridgetops and the flatwoods. The slopes range from 0 to 5 percent. The soils of the St. Johns series are sandy, siliceous, hyperthermic Typic Haplaquods.

St. Johns soils are closely associated with Basinger and Placid soils. Basinger and Placid soils do not have a spodic horizon.

Typical pedon of St. Johns sand, in an area of Basinger, St. Johns, and Placid soils; 1,700 feet north and 1,400 feet west of the southeast corner, sec. 8, T. 33 S., R. 31 E.

A—0 to 11 inches; black (10YR 2/1) sand; weak medium granular structure; friable; many very fine and fine roots; very strongly acid; gradual wavy boundary.

E—11 to 26 inches; light brownish gray (10YR 6/2) sand; single grained; loose; common fine and medium roots; strongly acid; clear smooth boundary.

Bh1—26 to 31 inches; very dark brown (10YR 2/2) sand; moderate medium granular structure; friable; very strongly acid; gradual wavy boundary.

Bh2—31 to 49 inches; black (10YR 2/1) sand; weak medium subangular blocky structure; friable; very strongly acid; gradual wavy boundary.

E'—49 to 70 inches; dark yellowish brown (10YR 4/4) sand; single grained; loose; strongly acid; gradual wavy boundary.

B'h—70 to 80 inches; very dark gray (10YR 3/1) sand; single grained; loose; strongly acid.

The soil reaction is extremely acid to very strongly acid. The texture below the A horizon is sand or fine sand.

The A horizon has hue of 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral (N) and has value of 2.

The E horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 to 3.

Some pedons have a BC horizon that has hue of 10YR, value of 4 to 6, and chroma of 3 or 4.

The E' horizon has hue of 10YR, value of 4 to 7, and chroma of 1 or 2. The B'h horizon is similar to the Bh horizon. Some pedons do not have the bisequum of E' and B'h horizons and are underlain by a C horizon.

Some pedons have a C horizon that has hue of 10YR, value of 4 to 7, and chroma of 1 to 3.

St. Lucie Series

The St. Lucie series consists of nearly level to moderately sloping, excessively drained, droughty soils that formed in marine and eolian deposits. These soils are on high ridges and knolls in the ridge part of the county. The slopes range from 0 to 8 percent. The soils of the St. Lucie series are hyperthermic, uncoated Typic Quartzipsamments.

St. Lucie soils are closely associated with Archbold, Astatula, Duette, Orsino, Paola, Pomello, and Tavares soils. Archbold soils have a water table at a depth of 40 to 60 inches. Astatula and Tavares soils have matrix colors of chroma of 3 or higher in the C horizon. Orsino and Paola soils have a Bw horizon. Duette and Pomello soils have a spodic horizon and are wetter than St. Lucie soils.

Typical pedon of St. Lucie sand, 0 to 8 percent slopes; on the Archbold Biological Station; 2,000 feet west and 2,700 feet north of the southeast corner, sec. 6, T. 38 S., R. 30 E.

A—0 to 4 inches; gray (10YR 5/1) sand; single grained; loose; many fine and medium roots; strongly acid; gradual wavy boundary.

C1—4 to 80 inches; white (10YR 8/1) sand; single grained; loose; many fine and medium roots; medium acid.

The soil reaction ranges from neutral to extremely acid. The texture is sand or fine sand to a depth of 80 inches or more. The silt plus clay content is less than 2 percent in the control section.

The A horizon has hue of 10YR, value of 5 or 6, and chroma of 1.

The C horizon has hue of 10YR, value of 7 or 8, and chroma of 1 or 2; or it is neutral (N) and has value of 8.

Samsula Series

The Samsula series consists of nearly level, very poorly drained, organic soils that formed in well decomposed organic material underlain by sandy marine sediment. These soils are in depressional areas and in large swamps and marshes throughout the county. The slopes range from 0 to 1 percent. The soils of the Samsula series are sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists.

Samsula soils are closely associated with Basinger, Hontoon, Placid, Sanibel, and Valkaria soils. Basinger, Placid, Sanibel, and Valkaria soils are mineral soils. In addition, Hontoon soils have organic material more than 51 inches thick.

Typical pedon of Samsula muck; in a drained depressional area; 2,100 feet west and 1,000 feet south of the northeast corner, sec. 3, T. 38 S., R. 31 E.

Oa1—0 to 12 inches; black (5YR 2/1) muck; about 4 percent rubbed fiber; moderate medium subangular blocky structure; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; common fine roots; extremely acid; (pH 3.7 in 0.01 molar calcium chloride solution); gradual wavy boundary.

Oa2—12 to 36 inches; black (10YR 2/1) muck; about 1 percent rubbed fiber; moderate medium subangular blocky structure; friable; dark brown (10YR 4/3) sodium pyrophosphate extract; common fine roots; extremely acid; (pH 3.7 in 0.01 molar calcium chloride solution); abrupt wavy boundary.

C—36 to 45 inches; black (10YR 2/1) mucky sand; weak fine granular structure; friable; strongly acid; gradual wavy boundary.

Cg1—45 to 50 inches; dark gray (10YR 4/1) sand; single grained; loose; strongly acid; gradual wavy boundary.

Cg2—50 to 59 inches; grayish brown (10YR 5/2) sand; single grained; loose; strongly acid; gradual wavy boundary.

Cg3—59 to 65 inches; gray (10YR 6/1) sand; single grained; loose; strongly acid.

The thickness of the organic material ranges from 16 to 40 inches. The organic material has pH value of less than 4.5 in 0.01 molar calcium chloride solution and has a pH range of 4.0 to 5.5 by the Hellige-Truog method. The underlying mineral material is strongly acid to extremely acid.

The Oa horizon has hue of 5YR to 10YR, value of 2, and chroma of 1; or it is neutral (N) and has value of 2. The fiber content is about 30 percent, unrubbed. The rubbed fiber content is about 5 percent or less.

The C horizon has hue of 10YR, value of 2, and chroma of 1; or it is neutral (N) and has value of 2. The texture is mucky sand or sand.

The Cg horizon has hue of 10YR, value of 4 to 6, and chroma of 1 or 2. The texture is sand or fine sand.

Sanibel Series

The Sanibel series consists of very poorly drained, sandy soils that have a layer of well decomposed organic material over the surface of the mineral soil. These soils are in transitional positions between mineral and organic soils. They are in marshes, swamps, and poorly defined drainageways up to several hundred acres in size. The slopes range from 0 to 2 percent. The soils of the Sanibel series are sandy, siliceous, hyperthermic Histic Humaquepts.

Sanibel soils are closely associated with Basinger, Kaliga, Placid, Samsula, and Tequesta soils. Basinger and Placid soils do not have a layer of organic material on the surface of the mineral soils. Samsula and Kaliga soils have an organic surface more than 16 inches thick. Tequesta soils have an argillic horizon.

Typical pedon of Sanibel muck; near the intersection of Henscratch and Clark Roads; approximately 1,000 east of the northwest corner, sec. 31, T. 36 S., R. 29 E.

Oa—0 to 8 inches; black (N 2/0) muck; weak fine granular structure; very friable; very strongly acid; gradual wavy boundary.

A—8 to 15 inches; black (10YR 2/1) mucky fine sand; weak fine granular structure; nonsticky; very strongly acid; gradual smooth boundary.

Cg1—15 to 40 inches; gray (10YR 5/1) sand; single grained; nonsticky; extremely acid; gradual wavy boundary.

Cg2—40 to 63 inches; gray (10YR 6/1) sand; mixed streaks of gray (10YR 5/1) sand and light brownish gray (10YR 6/2) sand; single grained; nonsticky; extremely acid; gradual wavy boundary.

Cg3—63 to 80 inches; light brownish gray (10YR 6/2) sand; single grained; nonsticky; extremely acid.

The soil reaction is extremely acid to neutral.

The thickness of the Oa horizon ranges from 8 to 15 inches. The organic material is sapric. It has hue of 10YR or 5YR, value of 2, and chroma of 1; or it is neutral (N) and has value of 2.

The A horizon has hue of 10YR, value of 2 to 5, and chroma of 1 or 2; or it is neutral (N) and has value of 2. The texture is mucky fine sand, fine sand, or sand.

The Cg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The texture is sand or fine sand.

Satellite Series

The Satellite series consists of nearly level, somewhat poorly drained, droughty soils that formed in marine deposits. These soils are on lower ridges in the ridge part of the county. The slopes range from 0 to 2 percent. The soils of the Satellite series are

hyperthermic, uncoated Aquic Quartzipsamments.

Satellite soils are closely associated with Archbold, Basinger, Daytona, Duette, Immokalee, Myakka, Pomello, and St. Lucie soils. Archbold soils are better drained than Satellite soils. Basinger soils have a layer that is more than 1 unit of value darker than the overlying horizon within 10 to 40 inches of the surface, and they are poorly drained. Daytona, Duette, Immokalee, Myakka, and Pomello soils have a spodic horizon. St. Lucie soils do not have a water table within 80 inches of the surface.

Typical pedon of Satellite sand; on the Avon Park Air Force Range; approximately 2,800 feet north and 200 feet west of the southeast corner, sec. 7, T. 33 S., R. 31 E.

A—0 to 4 inches; dark gray (10YR 4/1) sand, rubbed; single grained; loose; very strongly acid; clear smooth boundary.

C1—4 to 26 inches; white (10YR 8/1) fine sand; few coarse distinct brown (10YR 5/3 and 5/4) mottles along old root channels; single grained; loose; strongly acid; gradual wavy boundary.

C2—26 to 80 inches; white (10YR 8/1) fine sand; single grained; loose; slightly acid.

The soil reaction ranges from very strongly acid to mildly alkaline. The texture is sand or fine sand to a depth of 80 inches or more. Silt and clay is less than 2 percent in the control section.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1.

The C horizon has hue of 10YR, value of 6 to 8, and chroma of 1 or 2. Sand grains in this horizon do not have coatings of silt, clay, or sequioxides.

Smyrna Series

The Smyrna series consists of nearly level, poorly drained soils that formed in thick, sandy, marine deposits. These soils are on the broad flatwoods. The slopes range from 0 to 2 percent. The soils of the Smyrna series are sandy, siliceous, hyperthermic Aeric Haplaquods.

Smyrna soils are closely associated with Basinger, Immokalee, Myakka, and Valkaria soils. Basinger soils are in slightly lower positions on the landscape than Smyrna soils and do not have a spodic horizon. Immokalee soils have a spodic horizon between depths of 30 and 50 inches. Myakka soils have a spodic horizon between depths of 20 and 30 inches. Valkaria soils do not have a spodic horizon and have higher chroma than Smyrna soils.

Typical pedon of Smyrna sand; 1,500 feet east and 2,500 feet south of the northwest corner, sec. 14, T. 38 S., R. 31 E.

Ap—0 to 5 inches; dark gray (10YR 4/1) sand; single grained; loose; many very fine and common medium roots; medium acid; abrupt irregular boundary.

E—5 to 15 inches; light gray (10YR 6/1) fine sand; single grained; loose; very strongly acid; abrupt irregular boundary.

Bh1—15 to 18 inches; black (N 2/0) fine sand; weak fine subangular blocky structure; friable; extremely acid; clear irregular boundary.

Bh2—18 to 22 inches; dark brown (7.5YR 3/2) fine sand; few medium black (N 2/0) spodic bodies; single grained; loose; extremely acid; clear wavy boundary.

BC—22 to 35 inches; brown (10YR 5/3) fine sand; few medium distinct very dark grayish brown (10YR 3/2) mottles and few fine distinct brown (7.5YR 4/4) mottles; few to common iron cemented sandstone nodules; single grained; loose; very strongly acid; gradual wavy boundary.

C1—35 to 45 inches; light yellowish brown (10YR 6/4) fine sand; many coarse distinct strong brown (7.5YR 5/6) mottles and dark brown (7.5YR 4/4) mottles; few or common iron cemented sandstone nodules; single grained; loose; very strongly acid; gradual wavy boundary.

C2—45 to 56 inches; light gray (10YR 7/2) fine sand; common medium distinct brown (7.5YR 4/4) mottles; few iron cemented sandstone nodules; single grained; very strongly acid; gradual wavy boundary.

C3—56 to 80 inches; white (10YR 8/1) sand; few fine distinct brown (7.5YR 4/4) mottles; single grained; loose; extremely acid.

The thickness of the solum is less than 40 inches. The soil reaction ranges from medium acid to extremely acid except where lime has been added to the soil. The texture below the A horizon is sand or fine sand.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1; or it is neutral (N) and has value of 2.

The E horizon has hue of 10YR, value of 6 or 7, and chroma of 1 or 2.

The Bh horizon has hue of 5YR to 10YR, value of 2 or 3, and chroma of 1 or 2; or it is neutral (N) and has

chroma of 2. The BC horizon has hue of 10YR, value of 3 to 5, and chroma of 3.

Some pedons have an E' horizon and a B'h horizon at a depth of more than 40 inches. These horizons have the same color range as the E and Bh horizons.

The C horizon has hue of 10YR, value of 5 to 8, and chroma of 1 to 4.

Tavares Series

The Tavares series consists of nearly level to rolling, moderately well drained, droughty soils that formed in marine and eolian deposits. These soils are on moderately high ridges in the ridge part of the county. The slopes range from 0 to 12 percent. The soils of the Tavares series are hyperthermic, uncoated, Typic Quartzipsamments.

Tavares soils are closely associated with Astatula, Orsino, Paola, St. Lucie, and Satellite soils. Astatula, Paola, and St. Lucie soils are excessively drained. Orsino soils have an E horizon. Satellite soils are somewhat poorly drained.

Typical pedon of Tavares sand, 0 to 5 percent slopes; approximately 200 feet north and 500 feet east of the southwest corner, sec. 6, T. 34 S., R. 29 E.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) sand; single grained; loose; many fine and medium roots; strongly acid; clear wavy boundary.

C1—6 to 36 inches; yellow (10YR 5/6) sand; single grained; loose; few fine and medium roots; strongly acid; gradual wavy boundary.

C2—36 to 46 inches; very pale brown (10YR 7/4) sand; small pockets and lenses of white (10YR 8/1) sand; single grained; loose; strongly acid; gradual wavy boundary.

C3—46 to 56 inches; yellow (10YR 7/3) sand; many medium prominent reddish yellow (7.5YR 6/8) mottles; streaks and lenses of white (10YR 8/1) sand; single grained; loose; few fine roots; very strongly acid; abrupt wavy boundary.

C4—56 to 80 inches; white (10YR 8/1) sand; single grained; loose; few fine roots; strongly acid.

The soil reaction ranges from medium acid to extremely acid. The texture below the surface ranges from sand to fine sand. Silt plus clay in the 10- to 40-inch control section is between 2 and 5 percent.

The A horizon has hue of 10YR, value of 3 to 5, and chroma of 1 or 2.

The C1 and C2 horizons have hue of 10YR, value of 5 to 7, and chroma of 3 or 4.

The C3 and C4 horizons have hue of 10YR, value of 6 to 8, and chroma of 1 to 4. In some pedons, the C3 and C4 horizons have mottles in shades of brown and yellow.

Tequesta Series

The Tequesta series consists of nearly level, very poorly drained soils that formed in sandy and loamy marine sediment. These soils formed in conditions favorable for the accumulation of organic material. They are in marshes and depressions in the county and are generally about 5 to 300 acres in size. The slopes range from 0 to 2 percent. The soils of the Tequesta series are loamy, siliceous, hyperthermic Arenic Glossaqualfs.

Tequesta soils are closely associated with Basinger, Chobee, Hicoria, and Kaliga soils. Basinger, Chobee, and Hicoria soils do not have an organic surface layer. Kaliga soils have an organic surface more than 16 inches thick.

Typical pedon of Tequesta muck; in a drained area; 400 feet north and 1,800 feet east of the southwest corner, sec. 27, T. 37 S., R. 31 E.

Oa—0 to 12 inches; black (10YR 2/1) muck; less than 5 percent rubbed fiber; weak fine granular structure; friable; strongly acid; clear smooth boundary.

A—12 to 17 inches; black (10YR 2/1) fine sand; single grained; loose; about 10 percent organic matter; strongly acid; gradual wavy boundary.

Eg—17 to 32 inches; light brownish gray (10YR 6/2) fine sand; single grained; loose; slightly acid; gradual wavy boundary.

Btg—32 to 77 inches; dark gray (10Y 4/1) fine sandy loam; common medium prominent brownish yellow (10YR 6/8) mottles; weak fine subangular blocky structure; friable; slightly acid; gradual wavy boundary.

Cg—77 to 80 inches; light gray (10YR 7/2) fine sand; single grained; loose; few lenses of loamy sand; neutral.

The soil reaction ranges from strongly acid to neutral in the Oa and A horizons and from slightly acid to moderately alkaline in the Btg and 2Cg horizons.

The Oa horizon has hue of 10YR or 5YR, value of 2, and chroma of 1. This horizon ranges from 6 to 15 inches in thickness.

The A horizon has hue of 10YR, value of 2, and chroma of 1. The texture is sand or fine sand.

The Eg horizon has hue of 10YR, value of 5 or 6,

and chroma of 1 or 2. The texture is sand or fine sand.

The Btg horizon has hue of 10YR, value of 4 or 5, and chroma of 1 or 2. In some pedons, this horizon has mottles in shades of brown, yellow, and gray. The texture is sandy loam, fine sandy loam, or sandy clay loam.

The 2Cg horizon has hue of 10YR, value of 4 to 8, and chroma of 1 or 2. The texture is sand, fine sand, or loamy sand.

Valkaria Series

The Valkaria series consists of nearly level, poorly drained soils that formed in marine sand. These soils are on the low flatwoods and in sloughs and poorly defined drainageways in the county. The slopes range from 0 to 2 percent. The soils of the Valkaria series are siliceous, hyperthermic Spodic Psammaquents.

Valkaria soils are closely associated with Basinger, Immokalee, Malabar, Myakka, Pineda, Placid, and Smyrna soils. Basinger soils do not have chromas as high as Valkaria soils. Immokalee, Myakka, and Smyrna soils are in slightly higher positions on the landscape than Valkaria soils and have a dark spodic horizon. Malabar and Pineda soils have a Bt horizon. Placid soils have a thick, dark surface horizon.

Typical pedon of Valkaria fine sand; in an area of improved pasture; 500 feet north and 2,300 feet west of the southeast corner, sec. 34, T. 37 S., R. 32 E.

Ap—0 to 5 inches; gray (10YR 4/1) fine sand; single grained; loose; common fine and very fine roots; strongly acid; clear smooth boundary.

E1—5 to 11 inches; light gray (10YR 7/1) fine sand; single grained; loose; few fine and very fine roots; strongly acid; gradual wavy boundary.

E2—11 to 16 inches; light gray (10YR 7/2) fine sand; common medium prominent brownish yellow (10YR 6/8) mottles; single grained; loose; medium acid; gradual wavy boundary.

Bw1—16 to 33 inches; yellowish brown (10YR 5/8) fine sand; single grained; loose; medium acid; gradual wavy boundary.

Bw2—33 to 51 inches; light yellowish brown (10YR 6/4) fine sand; common medium faint brownish yellow (10YR 6/8) mottles; single grained; loose; very strongly acid; gradual wavy boundary.

C—51 to 80 inches; light gray (10YR 7/2) fine sand; single grained; loose; extremely acid.

The soil reaction ranges from very strongly acid to neutral in the A, E, and Bw horizons. It ranges from very strongly acid to moderately alkaline in the C horizon. Texture below the A horizon is fine sand or sand to a depth of 80 inches.

The A horizon has hue of 10YR, value of 2 to 4, and chroma of 1.

The E horizon has hue of 10YR, value of 6 or 7, and chroma 1 or 2.

The Bw horizon has hue of 10YR or 7.5YR, value of 5 to 7, and chroma of 4 to 8; or hue of 10YR, value of 7, and chroma of 3.

The C horizon has hue of 10YR, value of 5 to 7, and chroma of 1 or 2.

Formation of the Soils

In this section, the factors and processes of soil formation are discussed and related to the soils in the survey area.

Factors of Soil Formation

Soil is produced by forces of weathering acting on the parent material that has been deposited or accumulated by geologic agencies. The kind of soil that develops depends on five major factors. These factors are the type of parent material; the climate under which soil material has existed since accumulation; the plant and animal life in and on the soil; the relief, or lay of the land; and the length of time the forces of soil formation have acted on the soil material.

The five soil-forming factors are interdependent; each modifies the effect of the others. Any one of the five factors can have more influence than the others on the formation of a soil and can account for most of its properties. For example, if the parent material is quartz sand, the soil generally has weakly expressed horizons. In some places, the effect of the parent material is modified greatly by the effects of climate, relief, and plants and animals in and on the soil. As a soil forms, it is influenced by each of the five factors, but in some places one factor has a predominant effect. A modification or variation in any of these factors results in a different kind of soil.

Parent Material

Parent material is the unconsolidated mass from which a soil is formed. It determines the limits of the chemical and mineralogical composition of the soil. The parent material of the soils of Highlands County consists of beds of sandy and clayey materials that were transported and deposited by ocean currents. The ocean covered the area a number of times during the Pleistocene period. During the high stands of the sea, the Miocene-Pliocene sediments were eroded and redeposited or were reworked on the shallow sea bottom to form marine terraces. In Highlands County, the ridge part of the county has soils formed in eolian sands. These eolian sandy soils formed atop the Cypress Head Formation and the Hawthorn Group.

Climate

The climate of Highlands County is generally warm and humid. Temperature extremes are modified somewhat by the many lakes in the county. The average rainfall is about 55 inches per year. In summer, the climate is uniform throughout the county.

Few differences among the soils are caused by the climate; however, the climate aids in rapid decomposition of organic matter, and it hastens chemical reaction in the soil. The heavy rainfall leaches the soils of most plant nutrients and produces a strongly acid condition in many of the sandy soils. Rain also carries the less soluble fine particles downward.

Because of these climatic conditions, many soils have low organic content, low natural fertility, and low available water capacity.

Plants and Animals

Plants have been the principal biological factor in the formation of soils in the survey area. Animals, insects, bacteria, and fungi have also been important agents. Plants and animals furnish organic matter to the soil and bring nutrients from the lower layers to the upper layers of the soil. In places, plants and animals cause differences in the amount of organic matter, nitrogen, and nutrients in the soil and differences in soil structure and porosity. For example, crayfish and the roots of trees have penetrated the loamy subsoil and have mixed sandy layers with the subsoil.

Microorganisms, including bacteria and fungi, help to weather and break down minerals and to decompose organic matter. These organisms are most numerous in the upper few inches of the soil. Earthworms and other small animals inhabit the soil, alter its chemical composition, and mix it with other soil material; however, the native vegetation in the county has affected soil formation more than other living organisms.

Man has influenced the formation of soils by clearing the forests, cultivating the soils, draining wet areas, and introducing different kinds of plants. The complex of living organisms that affect soil formation has been drastically changed because of man's activities; nevertheless, these activities have had little effect on the soils except for loss of organic matter.

Relief

Relief has affected the formation of the soils in Highlands County mainly through its influence on soil-water relationships and through its effect on erosion in the central ridge part of the county. Other factors of soil formation generally associated with relief, such as temperature and plant cover, are of minor importance.

In the three general areas in the county—flatwoods, swamps, and central ridge—some differences in the soils are directly related to relief.

The soils on the flatwoods have a high water table, and periodically the surface is wet. The soils in the swamps are covered by water for long periods, and in many places, the content of organic matter in the surface layer is high. The soils on the central ridge are at higher elevations than those on the flatwoods and in the swamps. Most of the deep, sandy soils on the central ridge are better drained than the soils on the flatwoods and in the swamps and are not influenced by a ground water table.

Time

Time is an important factor in soil formation. The physical and chemical changes brought about by climate, living organisms, and relief are slow. The length of time needed to convert raw geological material into soil varies according to the nature of the geological material and the interaction of the other factors. Some basic minerals from which soils are formed weather fairly rapidly; other minerals are chemically inert and show little change over long periods. The translocation of fine particles within the soil to form horizons varies under differing conditions, but the processes always take a relatively long time.

Processes of Soil Formation

The soil genesis refers to the formation of soil horizons. The differentiation of horizons in soils in Highlands County is the result of accumulation of organic matter, leaching of carbonates, reduction and transfer of iron, or accumulation of silicate clay minerals. Sometimes more than one of these processes is involved.

Some organic matter has accumulated in the upper layers of most of the soils. The content of organic matter is low in some of the soils and fairly high in others.

Carbonates and salts have been leached in all of the soils. Because the leaching permitted the subsequent translocation of silicate clay materials in some soils, the effects have been indirect. The soils in Highlands County are leached to varying degrees.

The reduction and transfer of iron has occurred in most of the soils in the county except the organic soils. In some of the wet soils, iron in the subsoil forms yellowish brown horizons and some concretions. The Pineda soil, for example, has a yellowish brown layer with common segregated iron concretions.

References

(1) American Association of State Highway and Transportation Officials. 1982. Standard specifications for highway materials and methods of sampling and testing. Ed. 13, 2 vol., illus.

(2) American Society for Testing and Materials. 1986. Standard test method for classification of soils for engineering purposes. ASTM Stand. D 2487.

(3) Bishop, E. 1956. Geology and groundwater resources of Highlands County, Florida. Fla. Geol. Surv. Rep. of Invest., No. 15, p. 115.

(4) Bouyoucos, G.J. 1962. Hydrometer method improved for making particle size analyses of soils. Agron. J. 54: 464-465.

(5) Devane, Park T. 1971. History of Highlands County. Historical Soc., Highlands County, Fla.

(6) Doolittle, J.A. 1982. Characterizing soil map units with the ground-penetrating radar. Soil Survey Horizons. 23(4). Soil Sci. Soc. of Amer., pp. 3-10, illus.

(7) Florida Crop and Livestock Reporting Service. 1986. Fla. Agric. Stat., Commercial Citrus Inventory, Orlando, Fla.

(8) Schumacher, F.X., and T.S. Coile. 1960. Growth and yield of natural stands of the southern pines. 237 pp., illus.

(9) United States Department of Agriculture. 1929 (Rev. 1976). Volume, yield, and stand tables for second growth southern pines. Forest Serv., Misc. Publ. 50, 302 pp., illus.

(10) United States Department of Agriculture. 1951 (Being revised). Soil survey manual. U.S. Dep. Agric. Handb. 18, 503 pp., illus. (Supplements replacing pp. 173-188 issued May 1962.)

(11) United States Department of Agriculture. 1975. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. Soil Cons. Serv., U.S. Dep. of Agric. Handbook 436, 754 pp., illus.

(12) United States Department of Agriculture. 1984. Procedures for collecting soil samples and methods of analysis for soil survey. Soil Surv. Invest. Rep. 1, 68 pp., illus.

(13) United States Department of Agriculture. 1985. Site index and yield of second growth baldcypress. Soil Conserv. Serv., Tech. Note No. 5, 2 pp.

(14) University of Florida. 1985. Florida statistical abstract. Bur. of Econ. and Bus. Res., Coll. of Bus. Admin. 721 pp.

Glossary

ABC soil. A soil having an A, a B, and a C horizon.

AC soil. A soil having only an A and a C horizon. Commonly such soil formed in recent alluvium or on steep rocky slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Cation. An ion carrying a positive charge of electricity.The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels, i.e., clay coating, clay skin.

Climax vegetation. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

Coarse fragments. If round, mineral or rock particles 2 millimeters to 25 centimeters (10 inches) in diameter; if flat, mineral or rock particles (flagstone) 15 to 38 centimeters (6 to 15 inches) long.

Coarse textured soil. Sand or loamy sand.

Cobblestone (or cobble). A rounded or partly rounded fragment of rock 3 to 10 inches (7.5 to 25 centimeters) in diameter.

Complex, soil. A map unit of two or more kinds of soil in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils are somewhat similar in all areas.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—When wet, readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—When wet, adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depression. An area that is 6 inches to 2 feet lower in elevation than the surrounding landscape and is ponded for long periods.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—Water is removed from the soil very rapidly. Excessively drained soils are commonly very coarse textured, rocky, or shallow. Some are steep. All are free of the mottling related to wetness.

Somewhat excessively drained.—Water is removed from the soil rapidly. Many somewhat excessively drained soils are sandy and rapidly pervious. Some are shallow. Some are so steep that much of the water they receive is lost as runoff. All are free of the mottling related to wetness.

Well drained.—Water is removed from the soil readily, but not rapidly. It is available to plants throughout most of the growing season, and wetness does not inhibit growth of roots for significant periods during most growing seasons. Well drained soils are commonly medium textured. They are mainly free of mottling.

Moderately well drained.—Water is removed from the soil somewhat slowly during some periods. Moderately well drained soils are wet for only a short time during the growing season, but periodically they are wet long enough that most mesophytic crops are affected. They commonly have a slowly pervious layer within or directly below the solum, or periodically receive high rainfall, or both.

Somewhat poorly drained.—Water is removed slowly enough that the soil is wet for significant periods during the growing season. Wetness markedly restricts the growth of mesophytic crops unless artificial drainage is provided. Somewhat poorly drained soils commonly have a slowly pervious layer, a high water table, additional water from seepage, nearly continuous rainfall, or a combination of these.

Poorly drained.—Water is removed so slowly that the soil is saturated periodically during the growing season or remains wet for long periods. Free water is commonly at or near the surface for long enough during the growing season that most mesophytic crops cannot be grown unless the soil is artificially drained. The soil is not continuously saturated in layers directly below plow depth. Poor drainage results from a high water table, a slowly pervious layer within the profile, seepage, nearly continuous rainfall, or a combination of these.

Very poorly drained.—Water is removed from the

soil so slowly that free water remains at or on the surface during most of the growing season. Unless the soil is artificially drained, most mesophytic crops cannot be grown. Very poorly drained soils are commonly level or depressed and are frequently ponded. Yet, where rainfall is high and nearly continuous, they can have moderate or high slope gradients.

Drainage, surface. Runoff, or surface flow of water, from an area.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic)—Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated)—Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature, such as fire, that exposes the surface.

Excess fines (in tables). Excess silt and clay are in the soil. The soil is not a source of gravel or sand for construction purposes.

Excess humus. Too much organic matter for intended use.

Fast intake (in tables). The movement of water into the soil is rapid.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fine textured soil. Sandy clay, silty clay, and clay.

Flatwoods. Broad, nearly level landscapes of poorly drained, dominantly sandy soils vegetated by open slash pine forests with an understory of saw palmetto.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Forb. Any herbaceous plant that is not a grass or a sedge.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric and the more decomposed sapric material.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual.* The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue at the surface of a mineral soil.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

B horizon.—The mineral horizon below an O, A, or E horizon. The B horizon is, in part, a layer of transition from the overlying horizon to the underlying C horizon. The B horizon also has distinctive characteristics, such as accumulation of

clay, sesquioxides, humus, or a combination of these; prismatic or blocky structure; redder or browner colors than those in the A horizon; or a combination of these. The combined A and B horizons are generally called the solum, or true soil. If a soil does not have a B horizon, the A horizon alone is the solum.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the A or B horizon. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the Arabic numeral 2 precedes the letter C.

R layer.—Consolidated rock (unweathered bedrock) beneath the soil. The rock commonly underlies a C horizon, but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increaserscommonly are the shorter plants and the plants that are the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material. This contrasts with percolation, which is movement of water through soil layers or material.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, invader plants follow disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Leaching. The removal of soluble material from soil or other material by percolating water.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Low strength. The soil is not strong enough to support loads.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mounding. To heap and shape fill material, generally sandy, for elevated construction sites and sites for septic tank absorption fields. This practice is intended to overcome the detrimental effects of wetness.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color of 10YR hue, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan*.

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil adversely affects the specified use.

Permeability. The quality of the soil that enables water to move through the profile. Permeability is measured as the number of inches per hour that water moves through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Subsurface tunnels or pipelike cavities are formed by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Ponding. Standing water on soils in closed

depressions. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Poor filter (in tables). Because of rapid permeability, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). In these areas, surface or subsurface drainage outlets are difficult or expensive to install.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Rangeland. Land on which the potential climax vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential climax plant community for that site. Range condition is expressed as excellent, good, fair, or poor, on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of the acidity or alkalinity of a soil expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH value are—

Extremely acid	below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Medium acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rooting depth (in tables). There is a shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Seepage (in tables). The movement of water through the soil adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shrink-swell. The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75 feet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slough. Narrow to broad, generally grassy, poorly defined drainageway that is subject to sheet flow during the rainy season.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the A2 horizon. Generally refers to a leached horizon lighter in color and lower in organic matter content than the overlying surface layer.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terrace. An embankment, or ridge, constructed on the contour or at a slight angle to the contour across sloping soils. The terrace intercepts surface runoff, so that water soaks into the soil or flows slowly to a prepared outlet.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). An otherwise suitable soil material that is too thin for the specified use.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Unstable fill (in tables). There is a risk of caving or sloughing on banks of fill material.

Weathering. All physical and chemical changes produced by atmospheric agents in rocks or other deposits at or near the earth's surface. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. This contrasts with poorly graded soil.

Wetness. Soil is wet during some periods of use.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

[Recorded in the period 1932 through 1984 at Archbold Biological Station in Highlands County, Florida]

Month	Rainfall			Temperature				
	Mean total	Minimum total	Maximum total	Mean daily	Mean daily maximum	Mean daily minimum	Highest recorded	Lowest recorded
	In	In	In	°F	°F	°F	°F	°F
January	1.87	0.00	7.9	61.4	75.0	47.1	88	13
February	2.50	0.09	10.8	62.3	75.0	48.8	90	22
March	3.00	0.05	9.7	67.0	81.2	52.8	94	23
April	2.42	0.08	6.1	71.6	86.4	56.7	97	34
May	4.31	0.23	12.5	75.9	90.5	61.2	103	40
June	8.29	1.70	20.7	79.3	91.6	66.8	102	48
July	8.72	1.26	15.9	81.4	93.7	69.0	101	57
August	7.57	1.26	15.5	81.5	93.5	69.6	101	57
September	8.47	1.20	21.8	79.7	90.0	68.5	100	55
October	4.03	0.13	17.0	74.7	86.4	63.0	98	38
November	1.67	0.01	5.1	67.3	80.5	54.2	96	26
December	1.62	0.02	5.6	61.8	74.8	48.7	90	17

TABLE 2.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Paola sand, 0 to 8 percent slopes	7,347	1.1
2	St. Lucie sand, 0 to 8 percent slopes	2,596	0.4
3	Basinger fine sand, depressional	16,192	2.5
4	Duette sand, 0 to 5 percent slopes	1,417	0.2
5	Daytona sand, 0 to 5 percent slopes	2,367	0.4
6	Tavares sand, 0 to 5 percent slopes	6,148	0.9
7	Placid fine sand, depressional	15,115	2.3
8	Immokalee sand	82,950	12.6
9	Astatula sand, 0 to 8 percent slopes	39,304	6.0
10	Myakka fine sand	85,118	12.9
11	Orsino sand, 0 to 5 percent slopes	2,026	0.3
12	Basinger fine sand	63,186	9.6
13	Felda fine sand	25,699	3.9
14	Satellite sand	28,397	4.3
15	Bradenton fine sand	5,402	0.8
16	Valkaria fine sand	24,931	3.8
17	Malabar fine sand	7,559	1.2
18	Kaliga muck	19,665	3.0
19	Hicoria mucky sand, depressional	7,899	1.2
20	Samsula muck	17,256	2.6
21	Hontoon muck	10,583	1.6
22	Brighton muck	7,823	1.2
23	Gator muck	10,430	1.6
24	Pineda sand	7,278	1.1
25	Chobee fine sandy loam, depressional	4,350	0.7
26	Tequesta muck	18,049	2.7
28	Archbold sand, 0 to 5 percent slopes	14,022	2.1
29	Pomona sand	1,479	0.2
30	Oldsmar fine sand	5,534	0.8
31	Felda fine sand, depressional	3,275	0.5
32	Arents, very steep	2,991	0.5
33	Basinger, St. Johns, and Placid soils	29,281	4.4
34	Tavares-Basinger-Sanibel complex, rolling	6,597	1.0
35	Sanibel muck	7,818	1.2
36	Pomello sand, 0 to 5 percent slopes	10,935	1.7
37	Malabar sand, depressional	1,552	0.2
38	EauGallie fine sand	3,763	0.6
39	Smyrna sand	29,043	4.4
40	Arents, organic substratum	820	0.1
41	Anclote-Basinger fine sands, frequently flooded	2,357	0.4
42	Astatula-Urban land complex, 0 to 8 percent slopes	3,778	0.6
43	Urban land	898	0.1
44	Satellite-Basinger-Urban land complex	4,059	0.6
45	Paola-Basinger sands, rolling	5,988	0.9
46	Kaliga muck, frequently flooded	2,389	0.4
	Water areas less than 40 acres in size	2,644	0.4
	Total	658,310	100.0

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE

[Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil]

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Watermelons	Bahiagrass
		Boxes	Boxes	Tons	Tons	AUM*
1 Paola	VIs	500	600	---	---	---
2 St. Lucie	VIIs	---	---	---	---	---
3 Basinger	VIIw	---	---	---	---	---
4 Duette	VIs	350	450	---	---	5.0
5 Daytona	VIs	350	450	---	---	---
6 Tavares	IIIs	500	600	---	8	8.0
7 Placid	VIIw	---	---	---	---	---
8 Immokalee	IVw	350	550	15	9	---
9 Astatula	VIs	500	600	---	10	5.0
10 Myakka	IVw	350	550	15	9	9.0
11 Orsino	IVs	500	600	---	---	7.0
12 Basinger	IVw	325	525	12	7	8.0
13 Felda	IIIw	425	600	13	---	9.0
14 Satellite	VIs	---	---	---	5	5.0
15 Bradenton	IIIw	450	600	---	---	9.0
16 Valkaria	IVw	325	525	12	7	8.0
17 Malabar	IVw	325	525	12	7	8.0
18 Kaliga	IIIw	---	---	---	---	15.0
19 Hicoria	VIIw	---	---	---	---	---

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Watermelons	Bahiagrass
		Boxes	Boxes	Tons	Tons	AUM*
20----------------------- Samsula	IVw	---	---	---	---	15.0
21----------------------- Hontoon	IIIw	---	---	---	---	15.0
22----------------------- Brighton	IIIw	---	---	---	---	15.0
23----------------------- Gator	IIIw	---	---	---	---	15.0
24----------------------- Pineda	IIIw	425	600	13	9	9.0
25----------------------- Chobee	VIIw	---	---	---	---	---
26----------------------- Tequesta	IIIw	---	---	6	---	15.0
28----------------------- Archbold	VIs	400	525	---	---	5.0
29----------------------- Pomona	IVw	350	550	15	9	8.0
30----------------------- Oldsmar	IVw	350	550	15	9	8.0
31----------------------- Felda	VIIw	---	---	---	---	---
32. Arents						
33----------------------- Basinger, St. Johns and Placid	IVw	325	525	12	7	15.0
34----------------------- Tavares-Basinger-Sanibel	IIIs	500	600	---	---	---
35----------------------- Sanibel	IIIw	---	---	---	---	15.0
36----------------------- Pomello	VIs	350	450	---	---	---
37----------------------- Malabar	VIIw	---	---	---	---	---
38----------------------- EauGallie	IVw	350	550	15	9	8.0
39----------------------- Smyrna	IVw	350	550	15	9	8.0
40. Arents						

See footnote at end of table.

TABLE 3.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability	Oranges	Grapefruit	Tomatoes	Watermelons	Bahiagrass
		Boxes	Boxes	Tons	Tons	AUM*
41------------------------ Anclote-Basinger	VIw	---	---	---	---	---
42------------------------ Astatula-Urban land	---	---	---	---	---	---
43. Urban land						
44------------------------ Satellite-Basinger-Urban land	---	---	---	---	---	---
45------------------------ Paola-Basinger	---	---	---	---	---	---
46------------------------ Kaliga	VIIw	---	---	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

TABLE 4.--CAPABILITY CLASSES AND SUBCLASSES

[Miscellaneous areas are excluded. Absence of an entry indicates no acreage]

Class	Total acreage	Major management concerns (Subclass)	
		Wetness (w)	Soil problem (s)
		Acres	Acres
I	---	---	---
II	---	---	---
III	119,895	112,747	7,148
IV	352,126	350,100	2,026
V	---	---	---
VI	106,146	2,357	103,789
VII	53,368	50,772	2,596
VIII	---	---	---

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

[Only the soils that support rangeland vegetation suitable for grazing are listed]

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
1 Paola	Sand Pine Scrub	Favorable Normal Unfavorable	3,500 2,500 1,500	Lopsided indiangrass Pineland threeawn Grassleaf goldaster Creeping bluestem Beaked panicum Broomsedge bluestem Saw palmetto	10 10 10 10 5 5 5
2 St. Lucie	Sand Pine Scrub	Favorable Normal Unfavorable	3,500 2,500 1,500	Lopsided indiangrass Pineland threeawn Grassleaf goldaster Creeping bluestem Beaked panicum Broomsedge bluestem Saw palmetto	10 10 10 10 5 5 5
3 Basinger	Freshwater Marshes and Ponds	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane Blue maidencane Cutgrass Chalky bluestem Bluejoint panicum Sedges and rushes	50 10 10 5 5 5
4 Duette	Sand Pine Scrub	Favorable Normal Unfavorable	3,500 2,500 1,500	Lopsided indiangrass Pineland threeawn Grassleaf goldaster Creeping bluestem Beaked panicum Broomsedge bluestem Saw palmetto	10 10 10 10 5 5 5
5 Daytona	Sand Pine Scrub	Favorable Normal Unfavorable	3,500 2,500 1,500	Lopsided indiangrass Pineleaf threeawn Grassleaf goldaster Creeping bluestem Beaked panicum Broomsedge bluestem Saw palmetto	10 10 10 10 5 5 5
6 Tavares	Longleaf Pine-Turkey Oak Hills	Favorable Normal Unfavorable	4,000 3,000 2,000	Creeping bluestem Lopsided indiangrass Grassleaf goldaster Pineland threeawn Broomsedge Pinewoods dropseed Purple bluestem	15 15 10 5 5 5 5
7 Placid	Freshwater Marshes and Ponds	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane Blue maidencane Cutgrass Chalky bluestem Bluejoint panicum Sedges and rushes	50 10 10 5 5 5
8 Immokalee	South Florida Flatwoods	Favorable Normal Unfavorable	6,000 4,500 3,000	Creeping bluestem Chalky bluestem Lopsided indiangrass Pineland threeawn Saw palmetto Beaked panicum Panicum	50 10 10 5 5 5 5

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
9: Astatula	Longleaf Pine-Turkey Oak Hills	Favorable	4,000	Creeping bluestem	15
		Normal	3,000	Lopsided indiangrass	15
		Unfavorable	2,000	Grassleaf goldaster	10
				Pineland threeawn	5
				Broomsedge	5
				Pinewoods dropseed	5
				Purple bluestem	5
10: Myakka	South Florida Flatwoods	Favorable	6,000	Creeping bluestem	50
		Normal	4,500	Chalky bluestem	10
		Unfavorable	3,000	Lopsided indiangrass	10
				Pineland threeawn	5
				Saw palmetto	5
				Beaked panicum	5
				Panicum	5
11: Orsino	Sand Pine Scrub	Favorable	3,500	Lopsided indiangrass	10
		Normal	2,500	Pineland threeawn	10
		Unfavorable	1,500	Grassleaf goldaster	10
				Creeping bluestem	10
				Beaked panicum	5
				Broomsedge bluestem	5
				Saw palmetto	5
12: Basinger	Slough	Favorable	8,000	Blue maidencane	50
		Normal	6,000	Chalky bluestem	10
		Unfavorable	4,000	Bluejoint panicum	5
				Pineland threeawn	5
				Yelloweyed grass	5
13: Felda	Slough	Favorable	8,000	Blue maidencane	50
		Normal	6,000	Chalky bluestem	10
		Unfavorable	4,000	Bluejoint panicum	5
				Pineland threeawn	5
				Yelloweyed grass	5
14: Satellite	Sand Pine Scrub	Favorable	3,500	Lopsided indiangrass	10
		Normal	2,500	Pineland threeawn	10
		Unfavorable	1,500	Grassleaf goldaster	10
				Creeping bluestem	10
				Broomsedge bluestem	5
				Saw palmetto	5
15: Bradenton	Wetland Hardwood Hammock	Favorable	3,500	Longleaf uniola	20
		Normal	2,500	Eastern gamagrass	10
		Unfavorable	2,000	Chalky bluestem	10
				Switchgrass	10
				Annual forbs	5
16: Valkaria	Slough	Favorable	8,000	Blue maidencane	50
		Normal	6,000	Chalky bluestem	10
		Unfavorable	4,000	Bluejoint panicum	5
				Pineland threeawn	5
				Yelloweyed grass	5
17: Malabar	Slough	Favorable	8,000	Blue maidencane	50
		Normal	6,500	Chalky bluestem	10
		Unfavorable	4,000	Bluejoint panicum	5
				Pineland threeawn	5
				Yelloweyed grass	5

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo-sition
		Kind of year	Dry weight		
			Lb/acre		Pct
18----------------- Kaliga	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 10 5 5 5
19----------------- Hicoria	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 5 5 5 5
20----------------- Samsula	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 10 5 5 5
21----------------- Hontoon	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 10 5 5 5
22----------------- Brighton	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 10 5 5 5
23----------------- Gator	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 10 5 5 5
24----------------- Pineda	Slough-------------------------	Favorable Normal Unfavorable	8,000 6,000 4,000	Blue maidencane--------------- Chalky bluestem--------------- Bluejoint panicum------------- Pineland threeawn------------- Yelloweyed grass--------------	50 10 5 5 5
25----------------- Chobee	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 5 5 5 5
26----------------- Tequesta	Freshwater Marshes and Ponds--	Favorable Normal Unfavorable	10,000 7,500 5,000	Maidencane-------------------- Blue maidencane--------------- Cutgrass---------------------- Chalky bluestem--------------- Bluejoint panicum------------- Sedges and rushes-------------	50 10 5 5 5 5

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
28: Archbold	Sand Pine Scrub	Favorable	3,500	Lopsided indiangrass	10
		Normal	2,500	Pineland threeawn	10
		Unfavorable	1,500	Grassleaf goldaster	10
				Creeping bluestem	10
				Beaked panicum	5
				Broomsedge bluestem	5
				Saw palmetto	5
29: Pomona	South Florida Flatwoods	Favorable	6,000	Creeping bluestem	50
		Normal	4,500	Lopsided indiangrass	10
		Unfavorable	3,000	Chalky bluestem	10
				Pineland threeawn	5
				Saw palmetto	5
				Beaked panicum	5
				Paspalum	5
30: Oldsmar	South Florida Flatwoods	Favorable	6,000	Creeping bluestem	50
		Normal	4,500	Chalky bluestem	10
		Unfavorable	3,000	Lopsided indiangrass	10
				Pineland threeawn	5
				Saw palmetto	5
				Beaked panicum	5
31: Felda	Freshwater Marshes and Ponds	Favorable	10,000	Maidencane	50
		Normal	7,500	Blue maidencane	10
		Unfavorable	7,000	Cutgrass	10
				Chalky bluestem	5
				Bluejoint panicum	5
				Sedges and rushes	5
33:					
Basinger	Cutthroat Seep	Favorable	9,000	Cutthroatgrass	50
St. Johns		Normal	7,500	Chalky bluestem	15
Placid		Unfavorable	6,000	Creeping bluestem	15
				Toothachegrass	10
				Panicums	5
35: Sanibel	Freshwater Marshes and Ponds	Favorable	10,000	Maidencane	50
		Normal	7,500	Blue maidencane	10
		Unfavorable	5,000	Cutgrass	5
				Chalky bluestem	5
				Bluejoint panicum	5
				Sedges and rushes	5
36: Pomello	Sand Pine Scrub	Favorable	3,500	Lopsided indiangrass	10
		Normal	2,500	Pineland threeawn	10
		Unfavorable	1,500	Grassleaf goldaster	10
				Creeping bluestem	10
				Beaked panicum	5
				Broomsedge bluestem	5
				Saw palmetto	5
37: Malabar	Freshwater Marshes and Ponds	Favorable	10,000	Maidencane	50
		Normal	7,500	Blue maidencane	10
		Unfavorable	5,000	Cutgrass	5
				Chalky bluestem	5
				Bluejoint panicum	5
				Sedges and rushes	5

TABLE 5.--RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production: Kind of year	Total production: Dry weight	Characteristic vegetation	Composition
			Lb/acre		Pct
38 EauGallie	South Florida Flatwoods	Favorable	6,000	Creeping bluestem	50
		Normal	4,500	Chalky bluestem	10
		Unfavorable	3,000	Lopsided indiangrass	10
				Pineland threeawn	5
				Saw palmetto	5
				Beaked panicum	5
39 Smyrna	South Florida Flatwoods	Favorable	6,000	Creeping bluestem	50
		Normal	4,500	Chalky bluestem	10
		Unfavorable	3,000	Lopsided indiangrass	10
				Pineland threeawn	5
				Saw palmetto	5
				Beaked panicum	5
46 Kaliga	Freshwater Marshes and Ponds	Favorable	10,000	Maidencane	50
		Normal	7,500	Blue maidencane	10
		Unfavorable	5,000	Cutgrass	5
				Chalky bluestem	5
				Bluejoint panicum	5
				Sedges amd rushes	5

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY

[Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that inf
available]

Map symbol and soil name	Ordination symbol	Management concerns					Potential productivity			
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Common trees	Site index	Productivity class*	
1----------------- Paola	2S	Slight	Moderate	Severe	Slight	Slight	Sand pine-----------	50	2	Sand
							Sand live oak-------	---	---	
							Myrtle oak----------	---	---	
							Chapman oak---------	---	---	
							Turkey oak----------	---	---	
							Scrub hickory-------	---	---	
							Bluejack oak--------	---	---	
2----------------- St. Lucie	3S	Slight	Severe	Moderate	Slight	Slight	Sand pine-----------	60	3	Sand
							Sand live oak-------	---	---	
							Chapman oak---------	---	---	
							Myrtle oak----------	---	---	
3----------------- Basinger	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	2	*
							Baldcypress---------	---	---	
							Blackgum------------	---	---	
							Cabbage palm--------	---	---	
							Carolina ash--------	---	---	
							Loblollybay gordonia	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	
4----------------- Duette	6S	Slight	Moderate	Severe	Slight	Slight	Slash pine----------	59	6	Slas
							Sand pine-----------	45	2	Flo
							Sand live oak-------	---	---	lon
							Chapman oak---------	---	---	
							Myrtle oak----------	---	---	
5----------------- Daytona	4S	Slight	Moderate	Severe	Slight	Slight	Sand pine-----------	66	4	Slas
							Sand live oak-------	---	---	Flo
							Chapman oak---------	---	---	lon
							Myrtle oak----------	---	---	
6----------------- Tavares	10S	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slas
							Longleaf pine-------	70	6	Flo
							South Florida slash pine---------------	45	4	lon
							Turkey oak----------	---	---	
7----------------- Placid	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	2	*
							Baldcypress---------	---	---	
							Blackgum------------	---	---	
							Carolina ash--------	---	---	
							Loblollybay gordonia	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	
8----------------- Immokalee	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	8	Slas
							Longleaf pine-------	65	5	Flo
							South Florida slash pine---------------	35	3	
9----------------- Astatula	3S	Slight	Severe	Moderate	Slight	Slight	Sand pine-----------	60	3	Sand
							Turkey oak----------	---	---	
							South Florida slash pine---------------	35	---	
							Live oak------------	---	---	
							Longleaf pine-------	---	---	
10---------------- Myakka	8W	Slight	Moderate	Moderate	Moderate	Moderate	Slash pine----------	70	8	Slas
							Longleaf pine-------	60	4	Flo
							South Florida slash pine---------------	35	3	lon
11---------------- Orsino	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	70	8	Slas
							Longleaf pine-------	60	4	Flo
							Sand pine-----------	70	4	lon
							South Florida slash pine---------------	35	3	
							Sand live oak-------	---	---	
							Chapman oak---------	---	---	
							Myrtle oak----------	---	---	
							Scrub hickory-------	---	---	
12---------------- Basinger	8W	Slight	Severe	Severe	Slight	Severe	Slash pine----------	70	8	Slas
							South Florida slash pine---------------	35	3	Flo
13---------------- Felda	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	80	10	Slas
							South Florida slash pine---------------	45	4	Flo
							Cabbage palm--------	---	---	
14---------------- Satellite	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	70	8	Slas
							Longleaf pine-------	60	4	Flo
							Sand pine-----------	65	3	lon
							South Florida slash pine---------------	35	3	
							Sand live oak-------	---	---	
							Chapman oak---------	---	---	
							Myrtle oak----------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	T
15: Bradenton	11W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	90	11	Slas Flo
							Longleaf pine	75	6	
							South Florida slash pine	70	---	
							Live oak	---	---	
							Cabbage palm	---	---	
16: Valkaria	8W	Slight	Severe	Moderate	Slight	Moderate	Slash pine	70	8	Slas Flo
							South Florida slash pine	35	3	
17: Malabar	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slas Flo
							South Florida slash pine	45	4	
							Cabbage palm	---	---	
18: Kaliga	6W	Slight	Severe	Severe	Moderate	Severe	Baldcypress	100	6	*
							Blackgum	---	---	
							Red maple	---	---	
							Pondcypress	---	---	
							Sweetbay	---	---	
19: Hicoria	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	*
							Baldcypress	---	---	
							Blackgum	---	---	
							Loblolly bay	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Redbay	---	---	
20: Samsula	2W	Slight	Severe	Severe	Severe	Severe	Pondcypress	75	2	*
							Red maple	---	---	
							Sweetbay	---	---	
21: Hontoon	6W	Slight	Severe	Severe	Severe	Severe	Baldcypress	100	6	*
							Blackgum	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Cypress	---	---	
							Pondcypress	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	
22: Brighton	6W	Slight	Severe	Severe	Severe	Severe	Baldcypress	100	6	*
							Blackgum	---	---	
							Pondcypress	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Carolina ash	---	---	
							Red bay	---	---	
23: Gator	2W	Slight	Severe	Severe	Severe	Severe	Pondcypress	75	2	*
							Red maple	---	---	
							Sweetbay	---	---	
							Cabbage palm	---	---	
							Baldcypress	---	---	
24: Pineda	10W	Slight	Moderate	Severe	Slight	Moderate	Slash pine	80	10	Slas
							Longleaf pine	70	6	Flo
							South Florida slash pine	45	4	
							Cabbage palm	---	---	
							Water oak	---	---	
25: Chobee	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	*
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
26: Tequesta	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	*
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblolly pine	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
28: Archbold	3S	Slight	Severe	Moderate	Slight	Slight	Sand pine	60	3	Sand
							South Florida slash pine	35	3	Sou pi
							Myrtle oak	---	---	
							Chapman oak	---	---	
							Sand live oak	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	
29------------------ Pomona	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slas
							Longleaf pine-------	70	6	Flo
							South Florida slash pine---------------	45	4	
30------------------ Oldsmar	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slas
							Longleaf pine-------	65	5	Flo
							South Florida slash pine---------------	45	4	
31------------------ Felda	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	2	*
							Baldcypress---------	---	---	
							Blackgum------------	---	---	
							Cabbage palm--------	---	---	
							Loblollybay gordonia	---	---	
							Red maple-----------	---	---	
							Sweetbay------------	---	---	
							Red bay-------------	---	---	
33:										
Basinger----------	8W	Slight	Severe	Severe	Slight	Severe	Slash pine----------	70	8	Slas
							Longleaf pine-------	60	4	Flo
							South Florida slash pine---------------	35	3	
St. Johns---------	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine----------	80	10	Slas
							Longleaf pine-------	70	6	Flo
							South Florida slash pine---------------	45	4	
Placid------------	11W	Slight	Severe	Severe	Slight	Severe	Slash pine----------	84	11	Slas
							Longleaf pine-------	80	7	Flo
							South Florida slash pine---------------	55	---	
35------------------ Sanibel	3W	Slight	Severe	Severe	Moderate	Severe	Pondcypress---------	75	3	*
							Carolina ash--------	---	---	
							Blackgum------------	---	---	
36------------------ Pomello	8S	Slight	Moderate	Severe	Slight	Moderate	Slash pine----------	70	8	Slas
							Longleaf pine-------	60	4	Flo
							Sand pine-----------	60	3	lon
							South Florida slash pine---------------	35	3	
							Chapman oak---------	---	---	
							Myrtle oak----------	---	---	
							Sand live oak-------	---	---	

See footnotes at end of table.

TABLE 6.--WOODLAND MANAGEMENT AND PRODUCTIVITY--Continued

Map symbol and soil name	Ordination symbol	Management concerns: Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition	Potential productivity: Common trees	Site index	Productivity class*	
37: Malabar	2W	Slight	Severe	Severe	Moderate	Severe	Pondcypress	75	2	*
							Baldcypress	---	---	
							Blackgum	---	---	
							Cabbage palm	---	---	
							Carolina ash	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
38: EauGallie	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slas
							Longleaf pine	70	6	Flo
							South Florida slash pine	45	4	
39: Smyrna	10W	Slight	Moderate	Moderate	Slight	Moderate	Slash pine	80	10	Slas
							Longleaf pine	70	6	Flo
							South Florida slash pine	45	4	
41: Anclote	6W	Slight	Severe	Severe	Moderate	Severe	Baldcypress	100	6	*
							Blackgum	---	---	
							Water oak	---	---	
							Red maple	---	---	
							Sweetbay	---	---	
							Laurel oak	---	---	
							Pondcypress	---	---	
Basinger	6W	Slight	Severe	Severe	Severe	Severe	Baldcypress	100	6	*
							Water oak	---	---	
							Blackgum	---	---	
							Laurel oak	---	---	
							Red maple	---	---	
							Carolina ash	---	---	
46: Kaliga	6W	Slight	Severe	Severe	Severe	Severe	Baldcypress	100	6	*
							Pondcypress	---	---	
							Blackgum	---	---	
							Sweetbay	---	---	
							Loblollybay gordonia	---	---	
							Red maple	---	---	

* Productivity class is the yield in cubic meters per hectare per year calculated at the age of culmination increment for fully stocked natural stands.
** No recommended trees to plant because of severe ratings for management concerns.

TABLE 7.--RECREATIONAL DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "moderate" and "severe." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1 Paola	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
2 St. Lucie	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
3 Basinger	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
4 Duette	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
5 Daytona	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
6 Tavares	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
7 Placid	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
8 Immokalee	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
9 Astatula	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
10 Myakka	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
11 Orsino	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
12 Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
13 Felda	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
14 Satellite	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
15 Bradenton	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
16 Valkaria	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
17------------------- Malabar	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness, droughty.
18------------------- Kaliga	Severe: ponding, excess humus, percs slowly.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
19------------------- Hicoria	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
20------------------- Samsula	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
21------------------- Hontoon	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: excess humus, ponding.	Severe: ponding, excess humus.
22------------------- Brighton	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
23------------------- Gator	Severe: ponding, percs slowly, excess humus.	Severe: ponding, excess humus, percs slowly.	Severe: excess humus, ponding, percs slowly.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
24------------------- Pineda	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness, droughty.
25------------------- Chobee	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
26------------------- Tequesta	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
28------------------- Archbold	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
29------------------- Pomona	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
30------------------- Oldsmar	Severe: wetness, percs slowly, too sandy.	Severe: wetness, too sandy, percs slowly.	Severe: too sandy, wetness, percs slowly.	Severe: wetness, too sandy.	Severe: wetness, droughty.
31------------------- Felda	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
32------------------- Arents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
33:					
Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
St. Johns	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Placid	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
34:					
Tavares	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Sanibel	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
35 Sanibel	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
36 Pomello	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
37 Malabar	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding, droughty.
38 EauGallie	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: wetness, droughty.
39 Smyrna	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
40 Arents	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Moderate: wetness.
41:					
Anclote	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.
Basinger	Severe: flooding, wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness, flooding.	Severe: wetness, too sandy.	Severe: wetness, flooding.

TABLE 7.--RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
42:					
Astatula	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: too sandy.	Severe: droughty.
Urban land.					
43. Urban land					
44:					
Satellite	Severe: wetness, too sandy.	Severe: too sandy.	Severe: too sandy, wetness.	Severe: too sandy.	Severe: droughty.
Basinger	Severe: wetness, too sandy.	Severe: wetness, too sandy.	Severe: too sandy, wetness.	Severe: wetness, too sandy.	Severe: wetness.
Urban land.					
45:					
Paola	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: droughty.
Basinger	Severe: ponding.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.
46 Kaliga	Severe: flooding, wetness, excess humus.	Severe: wetness, excess humus.	Severe: excess humus, wetness, flooding.	Severe: wetness, excess humus.	Severe: wetness, flooding, excess humus.

TABLE 8.--WILDLIFE HABITAT

[See text for definitions of "good," "fair," "poor," and "very poor." Absence of an entry indicates that the soil was not rated]

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
1----------------- Paola	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
2----------------- St. Lucie	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
3----------------- Basinger	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
4----------------- Duette	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
5----------------- Daytona	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
6----------------- Tavares	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
7----------------- Placid	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
8----------------- Immokalee	Poor	Poor	Fair	Poor	Poor	Fair	Poor	Poor	Poor	Poor.
9----------------- Astatula	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
10---------------- Myakka	Poor	Fair	Fair	Poor	Poor	Fair	Poor	Fair	Poor	Poor.
11---------------- Orsino	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
12---------------- Basinger	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair.
13---------------- Felda	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Poor	Fair.
14---------------- Satellite	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
15---------------- Bradenton	Poor	Fair	Fair	Fair	Fair	Poor	Fair	Fair	Fair	Poor.
16---------------- Valkaria	Poor	Fair	Fair	Fair	Fair	Good	Fair	Poor	Poor	Good.
17---------------- Malabar	Poor	Poor	Poor	Poor	Poor	Fair	Fair	Poor	Poor	Fair.
18---------------- Kaliga	Fair	Fair	---	---	---	Good	Good	Fair	---	Good.
19---------------- Hicoria	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements							Potential as habitat for--		
	Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Openland wildlife	Woodland wildlife	Wetland wildlife
20----------------- Samsula	Fair	Good	---	---	---	Good	Good	Good	---	Good.
21----------------- Hontoon	Fair	Good	---	---	---	Good	Good	Good	---	Good.
22----------------- Brighton	Fair	Good	---	---	---	Good	Good	Good	---	Good.
23----------------- Gator	Fair	Good	---	---	---	Good	Good	Good	---	Good.
24----------------- Pineda	Poor	Fair	Fair	Poor	Poor	Good	Fair	Fair	Poor	Fair.
25----------------- Chobee	Very poor.	Very poor.	Very poor.	Fair	Very poor.	Good	Good	Very poor.	Poor	Good.
26----------------- Tequesta	Fair	Good	---	---	---	Good	Good	Good	---	Good.
28----------------- Archbold	Very poor.	Poor	Poor	Very poor.	Poor	Very poor.	Very poor.	Poor	Very poor.	Very poor.
29----------------- Pomona	Poor	Fair	Fair	Poor	Poor	Fair	Fair	Fair	Poor	Fair.
30----------------- Oldsmar	Poor	Fair	Fair	Poor	Fair	Poor	Poor	Fair	Fair	Poor.
31----------------- Felda	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
32----------------- Arents	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.
33:										
Basinger----------	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair.
St. Johns---------	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair.
Placid------------	Poor	Fair	Fair	Poor	Fair	Good	Good	Fair	Fair	Good.
34:										
Tavares-----------	Poor	Fair	Fair	Fair	Fair	Very poor.	Very poor.	Fair	Fair	Very poor.
Basinger----------	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair.
Sanibel-----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
35----------------- Sanibel	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good.
36----------------- Pomello	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
37----------------- Malabar	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Fair	Good	Very poor.	Very poor.	Good.

TABLE 8.--WILDLIFE HABITAT--Continued

Map symbol and soil name	Potential for habitat elements: Grain and seed crops	Grasses and legumes	Wild herbaceous plants	Hardwood trees	Coniferous plants	Wetland plants	Shallow water areas	Potential as habitat for--: Openland wildlife	Woodland wildlife	Wetland wildlife
38-----------------EauGallie	Poor	Poor	Fair	Poor	Poor	Poor	Poor	Poor	Poor	Poor
39-----------------Smyrna	Poor	Fair	Fair	Poor	Fair	Fair	Fair	Fair	Fair	Fair
40. Arents										
41:										
Anclote-----------	Very poor.	Very poor.	Poor	Fair	Poor	Good	Good	Very poor.	Poor	Good
Basinger----------	Very poor.	Very poor.	Poor	Fair	Poor	Fair	Fair	Very poor.	Poor	Fair
42:										
Astatula----------	Poor	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Urban land.										
43. Urban land										
44:										
Satellite---------	Very poor.	Poor	Poor	Poor	Poor	Poor	Very poor.	Poor	Poor	Very poor.
Basinger----------	Poor	Poor	Fair	Poor	Poor	Good	Fair	Poor	Poor	Fair
Urban land.										
45:										
Paola-------------	Very poor.	Poor	Poor	Poor	Poor	Very poor.	Very poor.	Poor	Poor	Very poor.
Basinger----------	Very poor.	Very poor.	Very poor.	Very poor.	Very poor.	Good	Good	Very poor.	Very poor.	Good
46-----------------Kaliga	Very poor.	Very poor.	Very poor.	Poor	Very poor.	Good	Good	Very poor.	Poor	Good

TABLE 9.--BUILDING SITE DEVELOPMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1 Paola	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
2 St. Lucie	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
3 Basinger	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
4 Duette	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
5 Daytona	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
6 Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
7 Placid	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
8 Immokalee	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
9 Astatula	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Severe: droughty.
10 Myakka	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
11 Orsino	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
12 Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
13 Felda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
14 Satellite	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
15 Bradenton	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
16 Valkaria	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
17 Malabar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
18 Kaliga	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, shrink-swell.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
19 Hicoria	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
20 Samsula	Severe: cutbanks cave, excess humus, ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, low strength.	Severe: ponding.	Severe: ponding, excess humus.
21 Hontoon	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
22 Brighton	Severe: excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
23 Gator	Severe: cutbanks cave, excess humus, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: subsides, ponding, low strength.	Severe: subsides, ponding.	Severe: ponding, excess humus.
24 Pineda	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
25 Chobee	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
26 Tequesta	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
28 Archbold	Severe: cutbanks cave.	Slight	Moderate: wetness.	Slight	Slight	Severe: droughty.
29 Pomona	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
30 Oldsmar	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
31 Felda	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
32. Arents	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: droughty, slope.
33:						
Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
St. Johns	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Placid	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
34:						
Tavares	Severe: cutbanks cave.	Slight	Moderate: wetness.	Moderate: slope.	Slight	Severe: droughty.
Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Sanibel	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
35. Sanibel	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, excess humus.
36. Pomello	Severe: cutbanks cave, wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.	Severe: droughty.
37. Malabar	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, droughty.
38. EauGallie	Severe: wetness, cutbanks cave.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness, droughty.
39. Smyrna	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
40. Arents	Severe: cutbanks cave, excess humus.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Severe: wetness, low strength.	Moderate: wetness.
41:						
Anclote	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
Basinger	Severe: cutbanks cave, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
42:						
Astatula	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Severe: droughty.
Urban land.						
43. Urban land						
44:						
Satellite	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Severe: droughty.
Basinger	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.
Urban land.						
45:						
Paola	Severe: cutbanks cave.	Moderate: slope.	Moderate: slope.	Severe: slope.	Moderate: slope.	Severe: droughty.
Basinger	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
46 Kaliga	Severe: cutbanks cave, excess humus, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, flooding, wetness.	Severe: subsides, wetness, flooding.	Severe: wetness, flooding, excess humus.

TABLE 10.--SANITARY FACILITIES

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "slight," "poor," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1. Paola	Slight*	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
2. St. Lucie	Slight*	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
3. Basinger	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
4. Duette	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
5. Daytona	Severe: wetness, poor filter.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
6. Tavares	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
7. Placid	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
8. Immokalee	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
9. Astatula	Slight*	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
10. Myakka	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
11. Orsino	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
12. Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
13 Felda	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
14 Satellite	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
15 Bradenton	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
16 Valkaria	Severe: wetness, poor filter.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
17 Malabar	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
18 Kaliga	Severe: ponding, percs slowly, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too clayey.	Severe: seepage, ponding.	Poor: too clayey, hard to pack, ponding.
19 Hicoria	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: ponding.	Severe: seepage, ponding.	Poor: ponding.
20 Samsula	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
21 Hontoon	Severe: subsides, ponding, poor filter.	Severe: excess humus, seepage, ponding.	Severe: excess humus, seepage, ponding.	Severe: seepage, ponding.	Poor: excess humus, ponding.
22 Brighton	Severe: subsides, ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, excess humus.	Severe: seepage, ponding.	Poor: ponding, excess humus.
23 Gator	Severe: ponding, percs slowly, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: ponding, thin layer.
24 Pineda	Severe: wetness, percs slowly, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
25 Chobee	Severe: ponding, percs slowly.	Severe: seepage, ponding.	Severe: seepage, ponding.	Severe: seepage, ponding.	Poor: seepage, ponding.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
26: Tequesta	Severe: ponding, percs slowly, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: ponding, seepage, too sandy.
28: Archbold	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
29: Pomona	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
30: Oldsmar	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
31: Felda	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
32: Arents	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope.	Severe: seepage, slope.	Poor: seepage, slope.
33:					
Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
St. Johns	Severe: wetness.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Placid	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, ponding, too sandy.	Severe: seepage, wetness.	Poor: wetness, too sandy, seepage.
34:					
Tavares	Moderate*: wetness.	Severe: seepage.	Severe: seepage, wetness, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Sanibel	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
35 Sanibel	Severe: ponding, poor filter.	Severe: seepage, excess humus, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
36 Pomello	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy.
37 Malabar	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
38 EauGallie	Severe: wetness.	Severe: wetness, seepage.	Severe: wetness, seepage, too sandy.	Severe: wetness, seepage.	Poor: too sandy, wetness, seepage.
39 Smyrna	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
40 Arents	Severe: wetness, poor filter.	Severe: excess humus, wetness.	Severe: wetness, excess humus.	Severe: wetness, excess humus.	Poor: hard to pack.
41:					
Anclote	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
Basinger	Severe: flooding, wetness, poor filter.	Severe: seepage, flooding, wetness.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: seepage, too sandy, wetness.
42:					
Astatula	Slight*	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Urban land.					
43. Urban land					
44:					
Satellite	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.
Basinger	Severe: wetness, poor filter.	Severe: seepage, wetness.	Severe: seepage, wetness, too sandy.	Severe: seepage, wetness.	Poor: seepage, too sandy, wetness.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
44. Urban land					
45:					
Paola	Moderate*: slope.	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
Basinger	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.
46 Kaliga	Severe: flooding, wetness, percs slowly.	Severe: seepage, flooding, excess humus.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage, wetness.	Poor: wetness, excess humus.

* Where there are many septic tanks, ground water contamination is possible because of the poor filtering capacity of the soil.

TABLE 11.--CONSTRUCTION MATERIALS

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "poor," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1--------------------- Paola	Good	Probable	Improbable: too sandy.	Poor: too sandy.
2--------------------- St. Lucie	Good	Probable	Improbable: too sandy.	Poor: too sandy.
3--------------------- Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
4--------------------- Duette	Good	Probable	Improbable: too sandy.	Poor: too sandy.
5--------------------- Daytona	Good	Probable	Improbable: too sandy.	Poor: too sandy.
6--------------------- Tavares	Good	Probable	Improbable: too sandy.	Poor: too sandy.
7--------------------- Placid	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
8--------------------- Immokalee	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
9--------------------- Astatula	Good	Probable	Improbable: too sandy.	Poor: too sandy.
10-------------------- Myakka	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
11-------------------- Orsino	Good	Probable	Improbable: too sandy.	Poor: too sandy.
12-------------------- Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
13-------------------- Felda	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
14-------------------- Satellite	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
15-------------------- Bradenton	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
16-------------------- Valkaria	Poor: wetness.	Probable	Improbable: too sandy.	Poor: wetness, too sandy.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
17-------------------- Malabar	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
18-------------------- Kaliga	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: excess humus, wetness.
19-------------------- Hicoria	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
20-------------------- Samsula	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: excess humus, wetness.
21-------------------- Hontoon	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: wetness, excess humus.
22-------------------- Brighton	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
23-------------------- Gator	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: excess humus, wetness.
24-------------------- Pineda	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
25-------------------- Chobee	Poor: wetness.	Improbable: excess fines.	Improbable: too sandy.	Poor: wetness.
26-------------------- Tequesta	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
28-------------------- Archbold	Good-----------------	Probable-------------	Improbable: too sandy.	Poor: too sandy.
29-------------------- Pomona	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
30-------------------- Oldsmar	Poor: wetness.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy, wetness.
31-------------------- Felda	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.
32-------------------- Arents	Poor: slope.	Probable-------------	Improbable: too sandy.	Poor: slope.
33: Basinger-------------	Poor: wetness.	Probable-------------	Improbable: too sandy.	Poor: too sandy, wetness.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
33:				
St. Johns	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Placid	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
34:				
Tavares	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Sanibel	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
35 Sanibel	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
36 Pomello	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
37 Malabar	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
38 EauGallie	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
39 Smyrna	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
40 Arents	Fair: thin layer.	Improbable: thin layer.	Improbable: too sandy.	Poor: too sandy.
41:				
Anclote	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
42:				
Astatula	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Urban land.				
43. Urban land				

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
44:				
Satellite	Fair: wetness.	Probable	Improbable: too sandy.	Poor: too sandy.
Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
Urban land.				
45:				
Paola	Good	Probable	Improbable: too sandy.	Poor: too sandy.
Basinger	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
46 Kaliga	Poor: wetness.	Probable	Improbable: too sandy.	Poor: excess humus, wetness.

TABLE 12.--WATER MANAGEMENT

[Some terms that describe restrictive soil features are defined in the Glossary. See text for definitions of "
"moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information
indicates the dominant soil condition; it does not eliminate the need for onsite investigation]

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
1 Paola	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowin
2 St. Lucie	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowin
3 Basinger	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowin
4 Duette	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
5 Daytona	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
6 Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
7 Placid	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, fast intake, soil blowing.	Ponding, too sandy, soil blowin
8 Immokalee	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
9 Astatula	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
10 Myakka	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty.	Wetness, too sandy, soil blowin

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
11 Orsino	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
12 Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
13 Felda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
14 Satellite	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
15 Bradenton	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy.
16 Valkaria	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
17 Malabar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
18 Kaliga	Severe: seepage.	Severe: thin layer, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Ponding, soil blowin percs slowl
19 Hicoria	Severe: seepage.	Severe: piping, ponding.	Severe: cutbanks cave.	Ponding, percs slowly.	Ponding, fast intake.	Ponding, soil blowin percs slowl
20 Samsula	Severe: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Ponding, subsides.	Ponding, soil blowing.	Ponding, soil blowin

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
21----------------- Hontoon	Severe: seepage.	Severe: excess humus, ponding.	Severe: cutbanks cave.	Subsides, ponding.	Ponding, soil blowing.	Ponding, soil blowin
22----------------- Brighton	Severe: seepage.	Severe: excess humus, ponding.	Slight---------	Ponding, subsides.	Ponding, soil blowing.	Ponding, soil blowin
23----------------- Gator	Severe: seepage.	Severe: piping, ponding.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly, subsides.	Ponding, soil blowing, percs slowly.	Ponding, soil blowin percs slowl
24----------------- Pineda	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
25----------------- Chobee	Moderate: seepage.	Severe: ponding, piping, seepage.	Severe: slow refill, cutbanks cave.	Ponding, percs slowly.	Ponding, soil blowing, percs slowly.	Ponding, soil blowin percs slowl
26----------------- Tequesta	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, droughty, soil blowing.	Ponding, soil blowin too sandy.
28----------------- Archbold	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake.	Too sandy, soil blowin
29----------------- Pomona	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill, cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
30----------------- Oldsmar	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: slow refill.	Percs slowly, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.
31----------------- Felda	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowin
32----------------- Arents	Severe: seepage, slope.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, soil blowing, slope.	Slope, soil blowin

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
33:						
Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
St. Johns	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Wetness, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy.
Placid	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, fast intake, soil blowing.	Wetness, too sandy, soil blowin
34:						
Tavares	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
Basinger	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
Sanibel	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, droughty, soil blowing.	Ponding, too sandy, soil blowin
35 Sanibel	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, subsides, cutbanks cave.	Ponding, droughty, soil blowing.	Ponding, too sandy, soil blowin
36 Pomello	Severe: seepage.	Severe: seepage, piping.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
37 Malabar	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowin
38 EauGallie	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Fast intake, wetness, droughty.	Wetness, too sandy, soil blowin

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for-- Pond reservoir areas	Limitations for-- Embankments, dikes, and levees	Limitations for-- Aquifer-fed excavated ponds	Features affecting-- Drainage	Features affecting-- Irrigation	Features affecting-- Terraces and diversions
39----------------- Smyrna	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
40----------------- Arents	Severe: seepage.	Severe: seepage, hard to pack.	Moderate: deep to water.	Cutbanks cave	Droughty, fast intake.	Wetness, too sandy, soil blowin
41: Anclote----------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
Basinger---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, cutbanks cave.	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
42: Astatula---------	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Droughty, fast intake, soil blowing.	Too sandy, soil blowin
Urban land.						
43. Urban land						
44: Satellite--------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
Basinger---------	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Cutbanks cave	Wetness, droughty, fast intake.	Wetness, too sandy, soil blowin
Urban land.						

TABLE 12.--WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--		
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions
45:						
Paola	Severe: seepage.	Severe: seepage, piping.	Severe: no water.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing
Basinger	Severe: seepage.	Severe: seepage, piping, ponding.	Severe: cutbanks cave.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing
46: Kaliga	Severe: seepage.	Severe: seepage, piping, wetness.	Severe: cutbanks cave.	Flooding, subsides.	Wetness, flooding, soil blowing.	Wetness, soil blowing

TABLE 13.--ENGINEERING INDEX PROPERTIES

[The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated. Some soils may have Unified classifications and USDA textures in addition to those shown. In general, the dominant classifications and textures are shown]

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 3 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct					Pct	
1---------------Paola	0-5	Sand-------------	SP	A-3	0	100	100	85-100	1-2	---	NP
	5-17	Sand, fine sand	SP	A-3	0	100	100	85-100	1-2	---	NP
	17-80	Sand, fine sand	SP	A-3	0	100	100	80-100	1-4	---	NP
2---------------St. Lucie	0-6	Sand-------------	SP	A-3	0	100	90-100	75-99	1-4	---	NP
	6-80	Sand, fine sand	SP	A-3	0	100	90-100	75-99	1-4	---	NP
3---------------Basinger	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
4---------------Duette	0-6	Sand-------------	SP	A-3	0	100	100	60-100	1-4	---	NP
	6-51	Fine sand, sand	SP	A-3	0	100	100	60-100	1-4	---	NP
	51-80	Fine sand, sand	SP, SP-SM	A-3, A-2-4	0	100	100	60-100	4-12	---	NP
5---------------Daytona	0-36	Sand, fine sand	SP, SP-SM	A-3	0	100	100	70-95	1-10	---	NP
	36-59	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	70-95	5-12	---	NP
	59-80	Sand, fine sand, coarse sand.	SP, SP-SM	A-3	0	100	100	70-95	4-10	---	NP
6---------------Tavares	0-6	Sand-------------	SP, SP-SM	A-3	0	100	95-100	80-100	2-10	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	80-100	2-10	---	NP
7---------------Placid	0-11	Fine sand--------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
	11-80	Sand, fine sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
8---------------Immokalee	0-6	Sand-------------	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	6-37	Fine sand, sand	SP, SP-SM	A-3	0	100	100	70-100	2-10	---	NP
	37-80	Fine sand, sand	SP-SM, SM	A-3, A-2-4	0	100	100	70-100	5-21	---	NP
9---------------Astatula	0-7	Sand-------------	SP, SP-SM	A-3	0	100	100	75-99	1-7	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	75-99	1-7	---	NP
10--------------Myakka	0-24	Fine sand--------	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
	24-58	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	5-20	---	NP
	58-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-8	---	NP
11--------------Orsino	0-46	Sand-------------	SP	A-3	0	100	100	85-95	1-3	---	NP
	46-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-100	2-10	---	NP
12--------------Basinger	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
13-------------- Felda	0-24	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-99	2-5	---	NP
	24-36	Sandy loam, very fine sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-99	15-35	<40	NP-15
	36-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-99	2-12	---	NP
14-------------- Satellite	0-4	Sand-------------	SP	A-3	0	100	100	80-95	1-4	---	NP
	4-80	Sand, fine sand	SP	A-3	0	100	100	80-95	1-4	---	NP
15-------------- Bradenton	0-4	Fine sand--------	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	4-14	Sand, fine sand	SP-SM	A-3, A-2-4	0	100	100	80-100	5-12	---	NP
	14-44	Sandy loam, very fine sandy loam, fine sandy loam, loamy fine sand.	SC, SM-SC	A-2-4, A-2-6	0	100	100	80-100	20-35	<40	NP-18
	44-80	Fine sand, loamy fine sand, fine sandy loam, very fine sandy loam.	SP-SM, SM, SM-SC, SC	A-3, A-2-4, A-2-6	0	100	100	80-100	5-35	<40	NP-18
16-------------- Valkaria	0-5	Fine sand--------	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	5-16	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
	16-51	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	3-10	---	NP
	51-80	Sand, fine sand	SP, SP-SM	A-3	0	100	75-100	75-100	2-10	---	NP
17-------------- Malabar	0-4	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	4-14	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	14-48	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	48-80	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	<35	NP-20
18-------------- Kaliga	0-39	Muck-------------	PT	---	---	---	---	---	---	---	---
	39-45	Fine sandy loam, loamy fine sand, very fine sand.	SM, SM-SC, SC	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	13-50	<40	NP-15
	45-68	Sandy clay, clay, sandy clay loam, very fine sandy loam.	SC, CL, CH	A-7, A-4, A-6	0	100	100	75-100	36-85	20-73	8-40
	68-80	Fine sandy loam, sandy loam, loamy sand, very fine sand.	SM, SM-SC	A-2-4	0	100	100	75-100	13-35	<28	NP-7
19-------------- Hicoria	0-4	Mucky sand-------	SP-SM, SM, SM-SC	A-3, A-2-4	0	100	100	90-100	5-20	<20	NP-5
	4-21	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	90-100	5-20	---	NP
	21-52	Sandy loam, fine sandy loam, sandy clay loam.	SM-SC, SC, SM	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	20-40	<30	NP-15
	52-80	Sand, fine sandy loam, sandy clay loam.	SM-SC, SC, SM, SP-SM	A-3, A-2-4, A-2-6	0	100	100	90-100	5-35	<30	NP-15

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments > 3 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
20------------- Samsula	0-36	Muck------------	PT	---	---	---	---	---	---	---	---
	36-65	Sand, fine sand	SP-SM, SM, SP	A-3, A-2-4	0	100	100	80-100	2-20	---	NP
21------------- Hontoon	0-65	Muck------------	PT	A-8	0	---	---	---	---	---	---
	65-80	Mucky sand, sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	60-95	2-20	---	NP
22------------- Brighton	0-12	Muck------------	PT	---	---	---	---	---	---	---	---
	12-80	Mucky-peat-------	PT	---	---	---	---	---	---	---	---
23------------- Gator	0-18	Muck------------	PT	A-8	0	---	---	---	---	---	---
	18-55	Loam, fine sandy loam, sandy clay loam.	SM-SC, SC, SM	A-2-4, A-2-6	0	100	100	80-99	25-35	<40	NP-15
	55-80	Fine sand, sand	SM, SP-SM	A-3, A-2-4	0	100	100	85-100	7-15	---	NP
24------------- Pineda	0-4	Sand------------	SP, SP-SM	A-3	0	100	100	80-95	2-8	---	NP
	4-30	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-95	2-10	---	NP
	30-56	Sandy loam, fine sandy loam, sandy clay loam.	SC, SM-SC, SM	A-2-4, A-2-6	0	100	100	65-95	15-35	<35	NP-20
	56-80	Sand, loamy sand, fine sand.	SP-SM, SM, SP	A-3, A-2-4	0	95-100	90-100	80-95	4-15	---	NP
25------------ Chobee	0-18	Fine sandy loam	SP-SM, SM	A-2-4	0	100	100	85-100	12-25	<40	NP-10
	18-57	Sandy loam, fine sandy loam, sandy clay loam.	SP-SM, SM, SC, SM-SC	A-2-4, A-2-6, A-6, A-7	0	100	100	85-100	12-45	<45	NP-25
	57-80	Sand, fine sand, loamy sand.	SP-SM, SM, SP	A-3, A-2-4	0	95-100	90-100	80-95	4-15	---	NP
26------------- Tequesta	0-12	Muck------------	PT	---	0	---	---	---	---	---	---
	12-32	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
	32-77	Sandy loam, sandy clay loam, fine sandy loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-100	15-35	<40	NP-20
	77-80	Sand, fine sand, loamy sand.	SP, SP-SM, SM	A-3, A-2-4, A-1-B	0	60-100	50-100	40-80	3-20	---	NP
28------------- Archbold	0-4	Sand------------	SP	A-3	0	100	100	89-100	1-3	---	NP
	4-80	Sand, fine sand	SP	A-3	0	100	100	89-100	1-3	---	NP
29------------- Pomona	0-6	Sand------------	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	6-29	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	29-51	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	85-100	5-15	---	NP
	51-61	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
	61-80	Sandy clay loam, sandy loam, sandy clay.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	95-100	85-100	25-50	<40	NP-16

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
30-------------- Oldsmar	0-32	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
	32-54	Fine sand, sand, loamy fine sand.	SM, SP-SM	A-2-4, A-3	0	100	100	80-100	5-20	---	NP
	54-60	Fine sandy loam, sandy loam, sandy clay loam.	SM-SC, SC	A-2-4, A-2-6	0	100	100	85-100	20-35	20-35	5-15
31-------------- Felda	0-5	Fine sand, sand	SP, SP-SM	A-3	0	100	100	90-100	2-5	---	NP
	5-31	Sand, fine sand	SP, SP-SM	A-3	0	100	100	90-100	2-5	---	NP
	31-70	Sandy loam, very fine sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	90-100	15-35	<40	NP-15
	70-80	Sand, fine sand, loamy sand.	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
32-------------- Arents	0-80	Variable---------	SP, SP-SM, SM	A-3, A-2-4	0	95-100	75-95	60-90	2-25	---	NP
33:											
Basinger-------	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand.	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
St. Johns------	0-11	Sand-------------	SP, SP-SM	A-3	0	100	100	75-95	3-10	---	NP
	11-26	Sand, fine sand	SP, SP-SM	A-3	0	100	100	85-95	3-10	---	NP
	26-49	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
	49-70	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-90	2-10	---	NP
	70-80	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	85-95	5-20	---	NP
Placid---------	0-14	Sand-------------	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
	14-80	Fine sand, sand, loamy fine sand.	SP, SP-SM, SM	A-3, A-2-4	0	100	100	90-100	1-20	---	NP
34:											
Tavares--------	0-6	Sand-------------	SP, SP-SM	A-3	0	100	95-100	80-100	2-10	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3	0	100	95-100	80-100	2-10	---	NP
Basinger-------	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
Sanibel--------	0-8	Muck-------------	PT	---	0	---	---	---	---	---	---
	8-15	Sand, fine sand, mucky fine sand.	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
	15-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
35-------------- Sanibel	0-8	Muck-------------	PT	---	0	---	---	---	---	---	---
	8-15	Sand, fine sand, mucky fine sand.	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
	15-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-95	1-10	---	NP
36-------------- Pomello	0-56	Sand-------------	SP, SP-SM	A-3	0	100	100	80-100	1-8	---	NP
	56-62	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	6-15	---	NP
	62-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	60-100	4-10	---	NP

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Frag- ments > 3 inches	Percentage passing sieve number-- 4	10	40	200	Liquid limit	Plas- ticity index
	In				Pct					Pct	
37--------------	0-18	Sand-------------	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
Malabar	18-48	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	3-12	---	NP
	48-59	Sandy clay loam, fine sandy loam, sandy loam.	SC, SM-SC, SM	A-2, A-4, A-6	0	100	100	80-100	20-40	<35	NP-20
	59-72	Sand, fine sand, loamy fine sand.	SP-SM, SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
38--------------	0-26	Fine sand--------	SP, SP-SM	A-3	0	100	100	80-98	2-5	---	NP
EauGallie	26-40	Sand, fine sand	SP-SM, SM	A-3, A-2-4	0	100	100	80-98	5-20	---	NP
	40-80	Sandy loam, fine sandy loam, sandy clay loam.	SM, SM-SC, SC	A-2-4, A-2-6	0	100	100	80-98	20-35	<40	NP-20
39--------------	0-15	Sand-------------	SP, SP-SM	A-3, A-2-4	0	100	100	80-100	2-12	---	NP
Smyrna	15-22	Sand, fine sand, loamy fine sand.	SM, SP-SM	A-3, A-2-4	0	100	100	80-100	5-20	---	NP
	22-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	80-100	2-10	---	NP
40--------------	0-12	Fine sand--------	SP, SP-SM	A-3, A-2-4, A-1-B	0-15	60-90	50-80	40-70	2-12	---	NP
Arents	12-38	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-12	---	NP
	38-52	Muck-------------	PT	A-8	0	---	---	---	---	---	---
	52-72	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	80-95	2-12	---	NP
41:											
Anclote--------	0-20	Fine sand--------	SP, SP-SM	A-3, A-2-4	0	100	95-100	85-100	2-12	---	NP
	20-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	95-100	85-100	2-12	---	NP
Basinger-------	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
42:											
Astatula-------	0-7	Sand-------------	SP, SP-SM	A-3	0	100	100	75-99	1-7	---	NP
	7-80	Sand, fine sand	SP, SP-SM	A-3	0	100	100	75-99	1-7	---	NP
Urban land.											
43. Urban land											
44:											
Satellite------	0-3	Sand-------------	SP	A-3	0	100	100	80-95	1-4	---	NP
	3-80	Sand, fine sand	SP	A-3	0	100	100	80-95	1-4	---	NP
Basinger-------	0-6	Fine sand--------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
Urban land.											

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Frag- ments > 3 inches	Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO		4	10	40	200		
	In				Pct					Pct	
45:											
Paola----------	0-5	Sand-------------	SP	A-3	0	100	100	85-100	1-2	---	NP
	5-17	Sand, fine sand	SP	A-3	0	100	100	85-100	1-2	---	NP
	17-80	Sand, fine sand	SP	A-3	0	100	100	80-100	1-4	---	NP
Basinger-------	0-6	Sand-------------	SP	A-3	0	100	100	85-100	1-4	---	NP
	6-80	Sand, fine sand	SP, SP-SM	A-3, A-2-4	0	100	100	85-100	2-12	---	NP
46------------- Kaliga	0-39	Muck-------------	PT	---	---	---	---	---	---	---	---
	39-45	Loam, fine sandy loam, loamy sand, very fine sand.	SM, SM-SC SC	A-2-4, A-2-6, A-4, A-6	0	100	100	90-100	13-50	<40	NP-15
	45-68	Sandy clay, clay, sandy clay loam, very fine sandy loam.	SC, CL, CH	A-7, A-4, A-6	0	100	100	75-100	36-85	20-73	8-40
	68-80	Fine sandy loam, sandy loam, loamy sand, very fine sand.	SM, SM-SC	A-2-4	0	100	100	75-100	13-35	<28	NP-7

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

[The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated]

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
1---------------- Paola	0-5	0-2	1.20-1.45	>20	0.02-0.05	3.6-7.3	Low----------	0.10	5	1	<.5
	5-17	0-2	1.45-1.60	>20	0.02-0.05	3.6-7.3	Low----------	0.10			
	17-80	0-3	1.45-1.60	>20	0.02-0.05	3.6-7.3	Low----------	0.10			
2---------------- St. Lucie	0-4	0-1	1.40-1.60	>20	0.02-0.05	3.6-7.3	Low----------	0.10	5	1	0-1
	4-80	0-1	1.50-1.60	>20	0.02-0.03	3.6-7.3	Low----------	0.10			
3---------------- Basinger	0-6	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10	5	2	1-8
	6-16	0-4	1.40-1.60	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
	16-48	1-3	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	48-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
4---------------- Duette	0-6	0-2	1.25-1.55	>20	0.03-0.06	4.5-7.0	Low----------	0.10	5	1	<1
	6-51	0-2	1.40-1.70	>20	0.02-0.05	4.5-7.0	Low----------	0.10			
	51-80	1-5	1.45-1.60	2.0-6.0	0.10-0.15	4.5-6.5	Low----------	0.10			
5---------------- Daytona	0-36	0-3	1.20-1.50	>20	0.02-0.05	3.6-6.0	Low----------	0.10	5	1	.5-1
	36-59	2-6	1.35-1.60	2.0-6.0	0.10-0.15	3.6-6.0	Low----------	0.15			
	59-80	1-4	1.45-1.70	>20	0.02-0.05	3.6-6.0	Low----------	0.10			
6---------------- Tavares	0-6	0-4	1.25-1.60	>6.0	0.05-0.10	3.6-6.0	Low----------	0.10	5	2	.5-2
	6-80	0-4	1.40-1.70	>6.0	0.02-0.05	3.6-6.0	Low----------	0.10			
7---------------- Placid	0-11	1-10	0.70-1.40	6.0-20	0.15-0.20	3.6-5.5	Low----------	0.10	5	2	2-10
	11-80	1-10	1.30-1.75	6.0-20	0.05-0.08	3.6-6.5	Low----------	0.10			
8---------------- Immokalee	0-6	1-5	1.20-1.50	6.0-20	0.05-0.10	3.6-6.0	Low----------	0.10	5	2	1-2
	6-37	1-5	1.45-1.70	6.0-20	0.02-0.05	3.6-6.0	Low----------	0.10			
	37-80	2-7	1.30-1.60	0.6-2.0	0.10-0.25	3.6-6.0	Low----------	0.15			
9---------------- Astatula	0-7	1-3	1.25-1.60	>20	0.04-0.10	4.5-6.5	Low----------	0.10	5	2	.5-2
	7-80	1-3	1.45-1.60	>20	0.02-0.05	4.5-6.5	Low----------	0.10			
10--------------- Myakka	0-24	0-2	1.35-1.45	6.0-20	0.05-0.15	3.6-6.5	Low----------	0.10	5	2	2-5
	24-58	1-8	1.45-1.60	6.0-20	0.02-0.05	3.6-6.5	Low----------	0.10			
	58-80	0-2	1.48-1.60	0.6-6.0	0.10-0.20	3.6-6.5	Low----------	0.15			
11--------------- Orsino	0-46	0-1	1.35-1.55	>20	0.02-0.08	3.6-6.0	Low----------	0.10	5	2	<1
	46-80	0-2	1.35-1.55	>20	0.02-0.08	3.6-6.0	Low----------	0.10			
12--------------- Basinger	0-6	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-8.4	Low----------	0.10	5	2	.5-2
	6-21	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
	21-52	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
13--------------- Felda	0-24	1-3	1.30-1.55	6.0-20	0.02-0.05	4.5-7.3	Low----------	0.10	5	2	1-4
	24-36	13-30	1.50-1.65	0.6-6.0	0.10-0.15	6.1-7.8	Low----------	0.24			
	36-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	Low----------	0.10			
14--------------- Satellite	0-4	1-3	1.10-1.55	>20	0.02-0.10	4.5-7.8	Low----------	0.10	5	2	.5-2
	4-80	0-2	1.35-1.55	>20	0.02-0.05	4.5-7.8	Low----------	0.10			
15--------------- Bradenton	0-4	1-6	1.20-1.50	6.0-20	0.08-0.12	5.1-7.3	Low----------	0.10	5	2	2-8
	4-14	1-6	1.40-1.70	6.0-20	0.03-0.07	5.1-7.3	Low----------	0.20			
	14-44	10-18	1.55-1.70	0.6-2.0	0.10-0.15	6.6-8.4	Low----------	0.24			
	44-80	1-18	1.55-1.70	0.6-6.0	0.03-0.10	7.4-8.4	Low----------	0.24			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodibility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
16----------- Valkaria	0-5	1-3	1.35-1.50	6.0-20	0.05-0.10	4.5-7.3	Low----------	0.10	5	2	1-4
	5-16	0-2	1.45-1.60	6.0-20	0.03-0.08	4.5-7.3	Low----------	0.10			
	16-51	2-5	1.45-1.60	6.0-20	0.05-0.10	4.5-7.3	Low----------	0.10			
	51-80	1-5	1.45-1.60	6.0-20	0.03-0.08	5.1-8.4	Low----------	0.10			
17----------- Malabar	0-4	0-4	1.35-1.55	6.0-20	0.03-0.08	5.1-8.4	Low----------	0.10	5	2	1-2
	4-14	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	Low----------	0.10			
	14-48	1-5	1.40-1.70	6.0-20	0.02-0.05	5.1-8.4	Low----------	0.10			
	48-80	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	Low----------	0.24			
18----------- Kaliga	0-39	---	0.15-0.35	6.0-20	0.20-0.25	3.6-4.4	Low----------	0.10	2	2	50-97
	39-45	8-27	1.50-1.65	0.6-6.0	0.10-0.15	4.5-7.3	Moderate-----	0.24			
	45-68	30-70	1.60-1.65	<0.2	0.10-0.20	4.5-7.3	High---------	0.32			
	68-80	8-20	1.50-1.65	2.0-20	0.10-0.15	4.5-7.3	Low----------	0.20			
19----------- Hicoria	0-4	2-8	0.80-1.25	6.0-20	0.15-0.30	3.6-6.5	Low----------	0.10	5	2	10-20
	4-21	1-7	1.65-1.80	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
	21-52	13-30	1.65-1.80	0.06-0.6	0.10-0.20	3.6-7.3	Low----------	0.24			
	52-80	2-30	1.65-1.80	0.06-0.6	0.10-0.20	3.6-7.3	Low----------	0.24			
20----------- Samsula	0-36	---	0.25-0.50	6.0-20	0.20-0.25	3.6-4.4	Low----------	----	2	2	>20
	36-65	1-14	1.35-1.55	6.0-20	0.02-0.05	3.6-5.5	Low----------	0.17			
21----------- Hontoon	0-65	---	0.20-0.40	6.0-20	0.30-0.50	3.6-4.4	Low----------	----	---	2	75-85
	65-80	1-5	1.30-1.55	6.0-20	0.15-0.20	4.5-5.5	Low----------	0.10			
22----------- Brighton	0-12	---	0.15-0.35	6.0-20	0.20-0.50	3.6-4.4	Low----------	0.10	2	2	60-90
	12-80	---	0.15-0.35	6.0-20	0.20-0.40	3.6-4.4	Low----------	----			
23----------- Gator	0-18	0-1	0.10-0.30	6.0-20	0.30-0.40	4.5-6.0	Low----------	----	---	2	55-85
	18-36	1-2	1.20-1.55	2.0-6.0	0.03-0.05	4.5-6.5	Low----------	0.17			
	36-55	13-20	1.60-1.70	<0.2	0.10-0.15	6.1-8.4	Low----------	0.32			
	55-80	2-4	1.20-1.55	2.0-6.0	0.03-0.05	6.1-8.4	Low----------	0.17			
24----------- Pineda	0-4	1-6	1.25-1.60	6.0-20	0.05-0.10	4.5-7.3	Low----------	0.10	5	2	.5-6
	4-30	1-8	1.40-1.70	6.0-20	0.02-0.05	4.5-7.3	Low----------	0.10			
	30-56	10-25	1.50-1.70	<0.2	0.10-0.15	5.1-8.4	Low----------	0.24			
	56-80	3-12	1.45-1.60	2.0-6.0	0.02-0.05	5.6-8.4	Low----------	0.10			
25----------- Chobee	0-18	10-20	1.15-1.30	2.0-6.0	0.15-0.20	5.1-7.3	Low----------	0.15	5	3	2-10
	18-57	10-30	1.40-1.65	<0.2	0.12-0.17	6.6-8.4	Low----------	0.15			
	57-80	7-20	1.60-1.75	0.2-6.0	0.06-0.10	7.4-8.4	Low----------	0.20			
26----------- Tequesta	0-12	---	0.20-0.40	6.0-20	0.20-0.25	5.1-7.3	Low----------	----	---	2	35-60
	12-32	1-6	1.45-1.65	6.0-20	0.05-0.10	5.1-7.3	Low----------	0.10			
	32-77	15-25	1.50-1.70	0.2-0.6	0.10-0.15	6.1-8.4	Low----------	0.24			
	77-80	5-12	1.40-1.65	6.0-20	0.02-0.05	6.1-8.4	Low----------	0.10			
28----------- Archbold	0-4	0-1	1.50-1.60	>20	0.03-0.05	3.6-6.5	Low----------	0.10	5	1	.5-1
	4-80	0-1	1.50-1.60	>20	0.02-0.03	3.6-6.5	Low----------	0.10			
29----------- Pomona	0-6	1-6	1.20-1.50	6.0->20	0.05-0.10	3.6-5.5	Low----------	0.10	5	2	1-2
	6-29	0-6	1.45-1.70	6.0-20	0.03-0.08	3.6-5.5	Low----------	0.10			
	29-51	2-7	1.30-1.60	0.6-20.0	0.10-0.20	3.6-5.5	Low----------	0.15			
	51-61	1-6	1.40-1.65	2.0-20	0.03-0.15	3.6-5.5	Low----------	0.10			
	61-80	13-36	1.50-1.80	<0.2	0.10-0.17	3.6-5.5	Low----------	0.20			
30----------- Oldsmar	0-32	0-2	1.48-1.61	6.0-20	0.02-0.05	3.6-7.3	Very low-----	0.10	5	2	1-2
	32-54	2-8	1.42-1.59	0.2-6.0	0.10-0.15	3.6-7.3	Low----------	0.15			
	54-60	15-30	1.60-1.69	<0.2	0.10-0.15	6.1-8.4	Low----------	0.24			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors K	Erosion factors T	Wind erodi-bility group	Organic matter
	In	Pct	G/cc	In/hr	In/in	pH					Pct
31--------------- Felda	0-5	1-3	1.30-1.55	6.0-20	0.05-0.10	5.1-7.8	Low----------	0.10	4	2	1-4
	5-31	1-3	1.45-1.55	6.0-20	0.02-0.05	5.1-7.8	Low----------	0.10			
	31-70	13-30	1.50-1.60	0.6-6.0	0.10-0.15	6.1-7.8	Low----------	0.24			
	70-80	1-10	1.50-1.65	6.0-20	0.02-0.05	6.1-8.4	Low----------	0.17			
32--------------- Arents	0-80	1-25	1.25-1.60	6.0-20	0.02-0.10	6.1-8.4	Low----------	0.10	3	2	<1
33: Basinger--------	0-6	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-8.4	Low----------	0.10	5	2	.5-2
	6-21	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
	21-52	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
St. Johns-------	0-11	1-4	1.30-1.50	6.0-20	0.10-0.15	3.6-5.5	Low----------	0.10	5	2	2-4
	11-26	1-3	1.50-1.70	6.0-20	0.03-0.08	3.6-5.5	Low----------	0.10			
	26-49	2-6	1.50-1.58	0.2-2.0	0.10-0.30	3.6-5.5	Low----------	0.15			
	49-70	1-4	1.50-1.65	6.0-20	0.03-0.08	3.6-5.5	Low----------	0.10			
	70-80	2-6	1.50-1.58	0.2-2.0	0.10-0.30	3.6-5.5	Low----------	0.10			
Placid----------	0-14	1-10	1.70-1.40	6.0-20	0.15-0.20	3.6-5.5	Low----------	0.10	5	2	2-10
	14-80	1-10	1.30-1.60	6.0-20	0.05-0.08	3.6-6.5	Low----------	0.10			
34: Tavares---------	0-6	0-4	1.25-1.60	>6.0	0.05-0.10	3.6-6.0	Low----------	0.10	5	2	.5-2
	6-80	0-4	1.40-1.70	>6.0	0.02-0.05	3.6-6.0	Low----------	0.10			
Basinger--------	0-6	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-8.4	Low----------	0.10	5	2	.5-2
	6-21	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
	21-52	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low----------	0.10			
Sanibel---------	0-8	---	0.30-0.55	6.0-20	0.20-0.50	3.6-7.3	Low----------	0.10	4	2	20-50
	8-15	2-6	1.40-1.60	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	15-80	2-6	1.50-1.65	6.0-20	0.03-0.10	3.6-7.3	Low----------	0.10			
35--------------- Sanibel	0-8	---	0.30-0.55	6.0-20	0.20-0.50	3.6-7.3	Low----------	0.10	4	2	20-50
	8-15	2-6	1.40-1.60	6.0-20	0.10-0.15	3.6-7.3	Low----------	0.10			
	15-80	2-6	1.50-1.65	6.0-20	0.03-0.10	3.6-7.3	Low----------	0.10			
36--------------- Pomello	0-56	0-2	1.35-1.65	>20	0.02-0.05	4.5-6.0	Low----------	0.10	5	1	<1
	56-62	0-2	1.45-1.60	2.0-6.0	0.10-0.30	4.5-6.0	Low----------	0.15			
	62-80	0-2	1.35-1.65	6.0-20	0.02-0.05	4.5-6.0	Low----------	0.10			
37--------------- Malabar	0-18	0-4	1.20-1.55	6.0-20	0.03-0.08	5.1-8.4	Low----------	0.10	5	2	1-2
	18-48	1-5	1.35-1.70	6.0-20	0.05-0.10	5.1-8.4	Low----------	0.10			
	48-59	12-25	1.55-1.75	<0.2	0.10-0.15	5.1-8.4	Low----------	0.24			
	59-72	1-8	1.40-1.70	6.0-20	0.03-0.08	5.1-8.4	Low----------	0.15			
38--------------- EauGallie	0-26	0-5	1.25-1.50	6.0-20	0.02-0.07	4.5-6.0	Low----------	0.10	5	2	2-8
	26-40	1-8	1.45-1.60	0.6-6.0	0.15-0.25	4.5-6.5	Low----------	0.15			
	40-80	13-31	1.55-1.70	0.06-2.0	0.10-0.20	4.5-7.8	Low----------	0.20			
39--------------- Smyrna	0-15	1-6	1.25-1.45	6.0-20	0.03-0.07	3.6-6.0	Low----------	0.10	5	2	1-5
	15-22	3-8	1.35-1.45	0.6-6.0	0.10-0.20	3.6-6.0	Low----------	0.15			
	22-80	1-6	1.50-1.75	6.0-20	0.03-0.07	3.6-6.0	Low----------	0.10			
40--------------- Arents	0-12	1-10	1.35-1.55	6.0-20	0.02-0.10	6.6-8.4	Low----------	0.10	5	2	---
	12-38	1-10	1.35-1.55	6.0-20	0.02-0.10	5.6-7.3	Low----------	0.10			
	38-52	---	0.20-0.40	6.0-20	0.30-0.50	5.1-7.3	Low----------	----			
	52-72	1-5	1.35-1.55	6.0-20	0.02-0.10	5.1-7.3	Low----------	0.10			

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodi-bility group	Organic matter
								K	T		
	In	Pct	G/cc	In/hr	In/in	pH					Pct
41:											
Anclote----------	0-20	2-8	1.30-1.45	6.0-20	0.10-0.15	5.6-8.4	Low-----------	0.10	5	2	2-10
	20-80	2-8	1.50-1.65	6.0-20	0.03-0.10	5.6-8.4	Low-----------	0.10			
Basinger---------	0-6	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-7.3	Low-----------	0.10	5	2	.2-1
	6-21	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-7.3	Low-----------	0.10			
	21-52	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low-----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10			
42:											
Astatula---------	0-7	1-3	1.25-1.60	>20	0.04-0.10	4.5-6.5	Low-----------	0.10	5	2	.5-2
	7-80	1-3	1.45-1.60	>20	0.02-0.05	4.5-6.5	Low-----------	0.10			
Urban land.											
43. Urban land											
44:											
Satellite--------	0-3	1-3	1.10-1.45	>20	0.02-0.10	4.5-7.8	Low-----------	0.10	5	2	.5-2
	3-80	0-2	1.35-1.55	>20	0.02-0.05	4.5-7.8	Low-----------	0.10			
Basinger---------	0-6	0-4	1.40-1.55	6.0-20	0.03-0.07	3.6-8.4	Low-----------	0.10	5	2	.5-2
	6-21	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10			
	21-52	1-6	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low-----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10			
Urban land.											
45:											
Paola------------	0-5	0-2	1.20-1.45	>20	0.02-0.05	3.6-7.3	Low-----------	0.10	5	1	<.5
	5-17	0-2	1.45-1.60	>20	0.02-0.05	3.6-7.3	Low-----------	0.10			
	17-80	0-3	1.45-1.60	>20	0.02-0.05	3.6-7.3	Low-----------	0.10			
Basinger---------	0-6	0-4	1.40-1.55	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10	5	2	1-8
	6-21	0-4	1.40-1.60	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10			
	21-52	1-3	1.40-1.65	6.0-20	0.10-0.15	3.6-7.3	Low-----------	0.10			
	52-80	1-3	1.50-1.70	6.0-20	0.05-0.10	3.6-7.3	Low-----------	0.10			
46--------------- Kaliga	0-39	---	0.15-0.35	6.0-20.0	0.20-0.25	3.6-4.4	Low-----------	----	2	2	50-97
	39-45	8-27	1.50-1.65	0.6-6.0	0.10-0.15	4.5-7.3	Moderate------	0.24			
	45-68	30-70	1.60-1.65	<0.2	0.10-0.20	4.5-7.3	High----------	0.32			
	68-80	8-20	1.50-1.65	2.0-20.0	0.10-0.15	4.5-7.3	Low-----------	0.20			

TABLE 15.--SOIL AND WATER FEATURES

["Flooding" and "water table" and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated]

Map symbol and soil name	Hydro-logic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Dura-tion	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
1. Paola	A	None	---	---	>6.0	---	---	---	---	Low	High.
2. St. Lucie	A	None	---	---	>6.0	---	---	---	---	Low	Moderate.
3*. Basinger	D	None	---	---	+2-0	Apparent	Jun-Feb	---	---	High	Moderate.
4. Duette	A	None	---	---	4.0-6.0	Apparent	Jun-Oct	---	---	Low	High.
5. Daytona	B	None	---	---	3.5-5.0	Apparent	Jul-Nov	---	---	Moderate	High.
6. Tavares	A	None	---	---	3.5-6.0	Apparent	Jun-Dec	---	---	Low	High.
7*. Placid	D	None	---	---	+2-0	Apparent	Jun-Mar	---	---	High	High.
8. Immokalee	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	High.
9. Astatula	A	None	---	---	>6.0	---	---	---	---	Low	High.
10. Myakka	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	High.
11. Orsino	A	None	---	---	3.5-5.0	Apparent	Jun-Dec	---	---	Low	Moderate.
12. Basinger	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	---	---	High	Moderate.
13. Felda	B/D	None	---	---	0-1.0	Apparent	Jul-Mar	---	---	High	Moderate.
14. Satellite	C	None	---	---	1.0-3.5	Apparent	Jun-Nov	---	---	Low	Moderate.
15. Bradenton	B/D	None	---	---	0-1.0	Apparent	Jun-Dec	---	---	High	Low.
16. Valkaria	B/D	None	---	---	0-1.0	Apparent	Jun-Sep	---	---	High	Moderate.
17. Malabar	B/D	None	---	---	0-1.0	Apparent	Jun-Nov	---	---	High	Low.
18*. Kaliga	B/D	None	---	---	+2-0	Apparent	Jun-Apr	16-20	24-45	High	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydro-logic group	Flooding: Frequency	Flooding: Duration	Flooding: Months	High water table: Depth	High water table: Kind	High water table: Months	Subsidence: Initial	Subsidence: Total	Risk of corrosion: Uncoated steel	Risk of corrosion: Concrete
					Ft			In	In		
19*------------ Hicoria	D	None-------	---	---	+2-0	Apparent	Jun-Feb	---	---	High-----	High.
20*------------ Samsula	B/D	None-------	---	---	+2-0	Apparent	Jan-Dec	16-20	30-36	High-----	High.
21*------------ Hontoon	B/D	None-------	---	---	+2-0	Apparent	Jan-Dec	16-24	>52	High-----	High.
22*------------ Brighton	B/D	None-------	---	---	+1-0	Apparent	Jan-Dec	16-20	50-60	High-----	High.
23*------------ Gator	B/D	None-------	---	---	+2-0	Apparent	Jun-Dec	6-14	20-23	High-----	High.
24------------- Pineda	B/D	None-------	---	---	0-1.0	Apparent	Jun-Nov	---	---	High-----	Low.
25*------------ Chobee	D	None-------	---	---	+2-0	Apparent	Jun-Feb	---	---	High-----	High.
26*------------ Tequesta	B/D	None-------	---	---	+2-0	Apparent	Jan-Dec	3-6	8-12	High-----	Low.
28------------- Archbold	A	None-------	---	---	3.5-6.0	Apparent	Jun-Nov	---	---	Low------	Moderate.
29------------- Pomona	B/D	None-------	---	---	0-1.0	Apparent	Jul-Sep	---	---	High-----	High.
30------------- Oldsmar	B/D	None-------	---	---	0-1.0	Apparent	Jun-Feb	---	---	Moderate	High.
31*------------ Felda	D	None-------	---	---	+2-0	Apparent	Jun-Feb	---	---	High-----	High.
32------------- Arents	A	None-------	---	---	>6.0	---	---	---	---	Low------	Low.
33:											
Basinger------	B/D	None-------	---	---	0-1.0	Apparent	Jun-Feb	---	---	High-----	Moderate.
St. Johns-----	B/D	None-------	---	---	0-1.0	Apparent	Jun-Apr	---	---	High-----	High.
Placid--------	B/D	None-------	---	---	0-1.0	Apparent	Jun-Apr	---	---	High-----	High.
34:											
Tavares-------	A	None-------	---	---	3.5-6.0	Apparent	Jun-Dec	---	---	Low------	High.
Basinger------	B/D	None-------	---	---	0-1.0	Apparent	Jun-Feb	---	---	High-----	Moderate.
Sanibel*------	B/D	None-------	---	---	+1-0	Apparent	Jun-Feb	3-5	5-15	High-----	Low.
35*------------ Sanibel	B/D	None-------	---	---	+1-0	Apparent	Jun-Feb	3-5	5-15	High-----	Low.
36------------- Pomello	C	None-------	---	---	2.0-3.5	Apparent	Jul-Nov	---	---	Low------	High.

See footnote at end of table.

TABLE 15.--SOIL AND WATER FEATURES--Continued

Map symbol and soil name	Hydrologic group	Flooding			High water table			Subsidence		Risk of corrosion	
		Frequency	Duration	Months	Depth	Kind	Months	Initial	Total	Uncoated steel	Concrete
					Ft			In	In		
37*: Malabar	D	None	---	---	+2-0	Apparent	Jun-Feb	---	---	High	Low.
38: EauGallie	B/D	None	---	---	0-1.0	Apparent	Jun-Oct	---	---	High	Moderate.
39: Smyrna	B/D	None	---	---	0-1.0	Apparent	Jul-Oct	---	---	High	High.
40: Arents	B	None	---	---	2.0-3.0	Apparent	Jun-Nov	---	---	High	High.
41:											
Anclote	D	Frequent	Long	Jun-Nov	0-1.0	Apparent	Jun-Feb	---	---	High	Moderate.
Basinger	D	Frequent	Long	Jul-Sep	0-1.0	Apparent	Jun-Feb	---	---	High	Moderate.
42:											
Astatula	A	None	---	---	>6.0	---	---	---	---	Low	High.
Urban land.											
43: Urban land	-	None	---	---	>2.0	---	---	---	---	---	---
44:											
Satellite	C	None	---	---	1.0-3.5	Apparent	Jun-Nov	---	---	Low	Moderate.
Basinger	B/D	None	---	---	0-1.0	Apparent	Jun-Feb	---	---	High	Moderate.
Urban land	-	None	---	---	>2.0	---	---	---	---	---	---
45:											
Paola	A	None	---	---	>6.0	---	---	---	---	Low	High.
Basinger*	D	None	---	---	+2-0	Apparent	Jun-Feb	---	---	High	Moderate.
46: Kaliga	D	Frequent	Very long.	Jun-Nov	0-1.0	Apparent	Jun-Feb	6-10	21	High	High.

* In the "High water table--Depth" column, a plus sign preceding the range in depth indicates that the water table is above the surface of the soil. The first numeral in the range indicates how high the water rises above the surface. The second numeral indicates the depth below the surface.

TABLE 16.--DEPTH TO WATER TABLE IN SELECTED SOILS

[Monthly readings were based on the average of two readings taken on the 1st and 15th of each month. Absence of an entry indicates that reading was not taken for that month. Measurements are in inches below soil surface. The symbol > means more than]

Soil	Year	Month											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		Inches											
Archbold	1982	--	--	--	--	--	--	--	55	50	49	57	60
	1983	62	59	46	65	66	72	69	60	54	55	67	69
	1984	72	75	76	>80	>80	>80	75	54	52	53	65	70
	1985	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80	>80
	1986	>80	>80	>80	>80	>80	>80	>80	78	75	>80	>80	>80
Basinger	1982	--	--	--	66	39	27	21	12	10	10	21	27
	1983	32	15	9	15	23	21	17	14	11	19	29	36
	1984	40	45	45	40	42	34	34	20	12	13	27	39
	1985	44	47	51	58	63	59	57	60	56	57	56	62
	1986	63	65	65	66	65	60	51	47	42	45	48	50
Pomello	1984	--	--	--	--	--	60	48	30	24	27	30	48
	1985	59	68	72	77	77	73	64	57	38	56	56	60
	1986	66	72	71	75	69	66	59	59	42	37	52	59
Satellite	1982	--	--	--	78	63	48	51	35	32	31	34	40
	1983	45	40	29	38	50	48	48	39	29	35	45	51
	1984	57	70	58	50	47	45	55	30	31	33	48	54
	1985	56	62	72	76	78	68	66	64	59	59	60	61
	1986	69	74	76	72	60	56	60	40	38	43	52	57

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS

Soil series and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity *	Bul dens * (fi mo
	Cm		Pct								Cm/hr	G/
Archbold sand:												
S82FL-55-08-1	0-8	A	0.0	1.7	68.6	27.9	1.4	99.6	0.0	0.4	82.1	1
-2	8-86	C	0.0	2.7	69.5	26.1	1.3	99.6	0.0	0.4	101.1	1
-3	86-145	C	0.0	2.0	66.8	29.9	1.0	99.7	0.0	0.3	82.2	1
-4	145-203	C	0.0	2.1	63.3	33.1	1.2	99.7	0.0	0.3	---	--
Astatula sand:												
S81FL-55-01-1	0-20	Ap	0.0	11.5	69.5	16.1	1.2	98.3	0.3	1.4	77.5	1
-2	20-84	C	0.0	9.8	65.0	21.2	2.4	98.4	0.0	1.6	88.8	1
-3	84-147	C	0.0	9.5	65.6	20.6	2.1	97.8	0.7	1.5	117.0	1
-4	147-203	C	0.0	7.6	61.9	25.5	2.4	97.4	1.1	1.5	95.3	1
Basinger fine sand:												
S85FL-55-17-1	0-15	Ap	0.0	2.5	21.2	62.8	10.7	97.2	2.2	0.6	24.5	1
-2	15-41	E1	0.0	2.2	17.9	65.2	12.2	97.3	2.2	0.5	23.7	1
-3	41-53	E2	0.0	2.0	16.8	65.7	12.2	96.7	2.5	0.8	20.4	1
-4	53-76	Bh/E	0.0	2.1	17.3	65.3	11.6	96.3	2.7	1.0	12.1	1
-5	76-132	Bh/E	0.0	1.8	16.3	64.5	11.5	94.1	3.2	2.7	6.4	1
-6	132-157	C1	0.0	1.8	13.3	64.8	12.2	92.1	2.5	5.4	9.3	1
-7	157-203	C2	0.0	1.7	11.4	59.0	12.0	84.1	2.7	13.2	0.0	1
Bradenton fine sand:												
S84FL-55-12-1	0-10	Ap	0.0	0.7	8.9	53.2	31.9	94.7	3.0	2.3	12.1	1.
-2	10-36	E	0.1	1.2	8.7	54.9	33.1	98.0	1.4	0.6	15.3	1.
-3	36-74	Btg	0.1	1.0	7.4	40.0	30.6	79.1	5.8	15.1	0.9	1.
-4	74-112	Btkg	0.4	1.4	7.0	38.8	32.6	80.2	7.0	12.8	1.9	1.
-5	112-152	Ckg1	0.0	1.0	7.2	45.2	33.0	86.4	5.9	7.7	4.7	1.
-6	152-203	Ckg2	1.6	2.4	7.6	38.0	26.8	76.4	9.3	14.3	0.4	1.
Chobee fine sandy loam:												
S85FL-55-20-1	0-8	A	0.0	1.8	15.7	36.6	6.5	60.6	14.3	25.1	34.8	0.
-2	8-46	A	0.0	2.6	19.6	45.5	7.8	75.5	7.6	16.9	0.8	1.
-3	46-91	Btg1	0.0	2.6	19.2	44.0	6.9	72.7	5.8	21.5	0.1	1.
-4	91-145	Btg2	0.0	3.3	22.4	46.5	6.8	79.0	4.1	16.9	0.2	1.
-5	145-203	C	0.2	4.2	20.6	57.3	8.4	90.7	1.4	7.9	0.7	1.
Daytona sand:												
S82FL-55-04-1	0-8	A	0.0	5.5	62.9	29.4	1.0	98.8	0.3	0.9	79.5	1.
-2	8-91	E	0.0	7.0	64.9	27.0	0.6	99.5	0.0	0.5	100.0	1.
-3	91-114	Bh	0.0	6.9	61.0	28.4	0.6	96.9	0.3	2.8	86.7	1.
-4	114-150	BC	0.0	5.8	60.5	31.3	0.7	98.3	0.0	1.7	71.6	1.
-5	150-203	C	0.0	5.4	57.5	35.2	0.8	98.9	0.0	1.1	73.6	1.

See footnote at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity *	Bul dens * (fie mois
	Cm		Pct								Cm/hr	G/c
Duette sand:												
S82FL-55-03-1	0-15	A	0.0	6.4	65.0	26.3	0.8	98.5	0.4	1.1	88.6	1.2
-2	15-46	E1	0.0	6.7	64.9	27.3	0.6	99.5	0.0	0.5	68.3	1.5
-3	46-130	E2	0.0	5.2	63.0	30.5	0.8	99.5	0.0	0.5	103.0	1.5
-4	130-150	Bh	0.0	4.8	60.8	31.0	0.7	97.3	0.1	2.6	75.6	1.4
-5	150-203	BC	0.0	4.3	57.4	35.5	1.0	98.2	0.2	1.6	105.3	1.5
EauGallie fine sand:												
S85FL-55-19-1	0-10	Ap	0.1	4.0	29.2	55.9	9.0	98.1	1.1	0.8	21.0	1.5
-2	10-41	E1	0.0	3.8	26.3	58.4	9.4	97.9	1.7	0.4	17.7	1.5
-3	41-66	E2	0.1	4.0	23.8	59.4	10.8	98.1	1.5	0.4	16.8	1.6
-4	66-84	Bh1	0.1	3.9	21.7	52.9	9.0	87.6	8.7	3.7	0.2	1.7
-5	84-102	Bh2	0.1	3.7	21.8	55.4	10.0	91.0	5.3	3.7	0.2	1.6
-6	102-135	Btg	0.0	2.8	19.4	45.1	7.9	72.2	2.6	22.2	2.4	1.6
-7	135-203	BCg	0.0	2.6	17.0	48.7	9.4	77.7	2.8	19.5	3.7	1.7
Felda fine sand:												
S84FL-55-10-1	0-18	Ap	0.0	0.3	5.6	66.4	25.3	97.6	1.3	1.1	25.3	1.3
-2	18-36	Eg1	0.0	0.6	5.8	57.3	34.4	98.1	1.6	0.3	13.5	1.5
-3	36-53	Eg2	0.0	0.5	5.2	56.4	35.3	97.4	2.0	0.6	12.3	1.5
-4	53-61	Eg3	0.0	0.7	5.6	53.1	31.7	91.1	3.7	5.2	0.6	1.6
-5	61-91	Btg	0.0	0.4	4.6	39.2	34.4	78.6	5.9	15.2	0.3	1.5
-6	91-117	Cg1	0.0	0.4	4.4	46.0	40.0	90.8	4.6	4.6	2.3	1.6
-7	117-173	Cg1	0.0	0.6	6.0	57.1	30.0	94.7	2.2	3.1	3.0	1.6
-8	173-203	Cg2	0.0	0.8	6.7	56.5	27.4	91.4	3.0	5.6	7.7	1.6
Hicoria mucky sand:												
S84FL-55-16-1	0-10	A1	---	---	---	---	---	---	---	---	106.0	0.8
-2	10-38	A2	1.2	6.0	18.2	40.1	25.9	91.4	5.5	3.1	27.6	1.0
-3	38-53	Eg	0.6	5.3	19.2	47.0	26.1	98.2	1.0	0.8	13.4	1.6
-4	53-99	Btg1	0.4	4.2	16.4	36.0	26.0	83.0	3.7	13.3	0.6	1.7
-5	99-132	Btg2	0.4	3.6	15.4	34.6	26.4	80.4	4.5	15.1	7.8	1.7
-6	132-203	BCg	0.8	6.6	19.6	37.4	16.6	81.0	3.5	15.5	1.1	1.7
Immokalee sand:												
S84FL-55-14-1	0-15	Ap	0.0	4.1	41.7	40.3	11.2	97.3	1.8	0.9	42.1	1.3
-2	15-36	E1	0.0	3.6	38.4	43.6	12.3	97.9	1.3	0.8	29.6	1.5
-3	36-94	E2	0.1	3.8	32.2	45.5	16.1	97.7	1.9	0.4	25.0	1.6
-4	94-152	Bh1	0.2	4.7	33.2	43.6	12.6	94.3	4.8	0.9	11.8	1.5
-5	152-203	Bh2	0.4	5.5	26.1	52.5	10.4	94.9	2.3	2.8	9.9	1.5

See footnote at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hy-draulic conduc-tivity *	Bul dens * (fie moi
	Cm		Pct								Cm/hr	G/c
Malabar fine sand:												
S84FL-55-11-1	0-10	Ap	0.0	2.0	17.3	54.2	23.6	97.1	0.9	2.0	30.6	1.
-2	10-36	E	0.3	3.3	14.8	53.9	26.3	98.6	0.8	0.6	21.4	1.
-3	36-76	Bw1	0.2	3.2	12.8	52.4	27.9	96.5	3.0	0.5	16.0	1.
-4	76-94	Bw2	0.2	2.9	10.9	50.3	28.5	92.8	3.5	3.7	1.7	1.
-5	94-112	Bw3	0.4	3.7	12.3	48.9	26.2	91.5	4.8	3.7	7.1	1.
-6	112-122	Bw4	0.6	4.1	11.7	52.5	25.7	94.6	3.0	2.4	2.6	1.
-7	122-165	Btg	0.4	4.0	12.4	43.2	23.6	83.6	4.1	12.3	0.7	1.
-8	165-203	Btg	0.6	4.2	12.8	41.2	18.6	77.4	4.0	18.6	0.0	1.
Orsino sand:												
S82FL-55-05-1	0-5	A	0.0	5.8	65.0	28.1	0.6	99.5	0.0	0.5	68.4	1.
-2	5-61	E	0.0	5.5	63.9	29.6	0.5	99.5	0.0	0.5	98.8	1.
-3	61-117	E	0.0	5.5	62.3	31.1	0.6	99.5	0.0	0.5	78.8	1.
-4	117-168	Bw/Bh	0.0	4.7	58.3	34.2	0.5	97.7	0.0	2.3	164.5	1.
-5	168-203	C	0.0	2.7	53.0	42.3	0.6	98.6	0.3	1.1	91.4	1.
Paola sand:												
S82FL-55-06-1	0-13	Ap	0.0	7.0	63.0	29.4	0.5	99.0	0.0	0.1	68.3	1.
-2	13-43	E	0.0	6.7	60.4	31.4	0.6	99.1	0.8	0.1	99.3	1.
-3	43-68	Bw	0.0	6.6	63.2	28.7	0.4	98.9	0.7	0.4	94.0	1.
-4	68-107	C1	0.0	6.5	60.5	30.9	0.3	98.2	0.9	0.9	115.5	1.
-5	107-155	C2	0.0	5.8	58.4	33.5	0.5	98.2	0.7	1.1	103.3	1.
-6	155-203	C2	0.0	5.3	56.4	36.3	0.4	98.4	0.0	1.6	79.5	1.
Placid fine sand:												
S85FL-55-23-1	0-8	A	---	---	---	---	---	---	---	---	50.0	0.
-2	8-28	A	0.0	1.7	33.0	51.9	10.6	97.2	1.5	1.3	11.8	1.
-3	28-96	Cg1	0.0	1.7	29.9	53.8	13.0	98.4	1.2	0.4	20.1	1.
-4	96-124	Cg2	0.0	1.8	28.3	51.6	11.6	93.3	2.3	4.4	3.7	1.
-5	124-145	Cg3	0.0	1.8	27.9	52.6	11.1	93.4	2.3	4.3	7.6	1.
-6	145-203	Cg4	0.0	1.8	26.9	53.6	11.4	93.7	2.0	4.3	9.9	1.
Pomello sand:												
S85FL-55-22-1	0-10	A	0.0	3.3	64.0	29.4	1.8	98.5	1.1	0.4	61.8	1.
-2	10-76	E	0.0	2.6	54.9	37.7	3.7	98.9	0.3	0.8	55.2	1.
-3	76-142	E	0.0	2.5	54.0	38.6	3.4	98.5	1.1	0.4	57.9	1.
-4	142-157	Bh	0.0	2.7	49.6	37.2	2.7	92.2	3.8	4.0	10.8	1.
-5	157-203	BC	0.0	2.9	52.2	40.6	1.8	97.5	1.4	1.1	49.6	1.

See footnote at end of table.

TABLE 17.--PHYSICAL ANALYSES OF SELECTED SOILS--Continued

Soil series and sample number	Depth	Horizon	Particle-size distribution: Sand: Very coarse (2.1 mm)	Coarse (1-0.5 mm)	Medium (0.5-0.25 mm)	Fine (0.25-0.1 mm)	Very fine (0.1-0.05 mm)	Total (2-0.05 mm)	Silt (0.05-0.002 mm)	Clay (<0.002 mm)	Hydraulic conductivity *	Bulk densi * (fiel mois
	Cm		Pct								Cm/hr	G/cm
St. Lucie sand:												
S82FL-55-07-1	0-15	A	0.0	16.1	73.1	9.9	0.4	99.5	0.1	0.4	131.4	1.4
-2	15-79	C	0.0	14.0	70.7	13.9	0.9	99.5	0.0	0.5	129.5	1.5
-3	79-142	C	0.0	11.8	69.4	17.2	1.1	99.5	0.0	0.5	103.6	1.5
-4	142-203	C	0.0	9.7	67.8	21.2	1.0	99.7	0.0	0.3	112.5	1.5
Satellite sand:												
S85FL-55-21-1	0-10	A	0.0	1.7	44.4	49.4	2.5	98.0	1.5	0.5	57.9	1.5
-2	10-66	C1	0.0	2.5	40.1	52.8	3.4	98.8	1.0	0.2	53.2	1.6
-3	66-127	C2	0.0	2.6	38.8	53.5	3.8	98.7	1.1	0.2	53.9	1.6
-4	127-203	C2	0.0	2.9	37.2	55.7	2.9	98.7	0.9	0.4	47.3	1.5
Smyrna sand:												
S84FL-55-15-1	0-13	Ap	0.1	4.2	21.8	42.8	27.4	96.3	2.4	1.3	18.4	1.2
-2	13-38	E	0.3	4.0	19.1	44.7	29.0	97.1	2.3	0.6	14.8	1.5
-3	38-46	Bh1	0.3	4.4	18.7	42.1	26.1	91.6	4.3	4.1	11.2	1.4
-4	46-56	Bh2	0.3	4.1	17.5	44.0	26.0	91.9	3.6	4.5	34.2	1.4
-5	56-89	BC	0.3	3.9	16.2	45.3	29.7	95.4	2.7	1.9	18.4	1.6
-6	89-114	C1	0.4	4.7	17.4	43.0	29.4	94.9	2.6	2.5	10.6	1.7
-7	114-142	C2	0.4	4.9	16.6	40.0	28.5	93.0	1.0	6.0	7.6	1.6
-8	142-203	C3	0.6	5.7	19.4	42.1	27.1	94.9	1.6	3.5	1.3	1.8
Tavares sand:												
S82FL-55-02-1	0-15	A	0.0	9.3	56.3	29.4	2.6	97.6	0.6	1.8	63.7	1.4
-2	15-91	C1	0.0	10.2	59.5	26.7	1.5	97.9	0.9	1.2	85.4	1.5
-3	91-117	C2	0.0	9.6	55.9	29.6	2.6	97.7	1.0	1.3	80.8	1.6
-4	117-142	C3	0.1	10.9	58.4	26.8	1.8	98.0	0.8	1.2	97.8	1.6
-5	142-203	C4	0.2	9.1	54.2	32.6	2.5	98.6	0.8	0.6	84.1	1.6
Valkaria fine sand:												
S84FL-55-09-1	0-13	Ap	0.0	0.1	3.8	62.0	31.1	97.0	2.2	0.8	18.2	1.4
-2	13-28	E1	0.0	0.2	4.0	63.3	30.6	98.1	1.3	0.6	10.3	1.5
-3	28-41	E2	0.0	0.2	3.9	62.4	31.3	97.8	1.1	1.1	14.5	1.5
-4	41-84	Bw1	0.0	0.2	3.8	59.7	32.2	95.9	2.0	2.1	27.1	1.5
-5	84-130	Bw2	0.0	0.2	3.7	63.3	29.7	96.9	2.1	1.0	13.8	1.5
-6	130-203	C	0.0	0.3	4.6	65.8	26.7	97.4	1.7	0.9	6.1	1.6

* Some of this data is slightly outside of the properties given in table 14. The original concept has
this time because of the small amount of data available.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Extractable bases					Extractable acidity	Sum of cations	Base saturation	Organic carbon *	Electrical conductivity	pH **			Pyrop extr
			Ca	Mg	Na	K	Sum						H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	C
	Cm		--Milliequivalents/100 grams of soil--							Pct	Pct	Mmhos/cm				Pct
Archbold sand:																
S82FL-55-08-1	0-8	A	0.06	0.02	0.01	0.00	0.09	0.68	0.77	12	0.27	0.01	5.3	4.0	3.6	---
-2	8-86	C	0.02	0.01	0.01	0.00	0.04	0.18	0.22	18	0.05	0.01	5.7	5.1	4.6	---
-3	86-145	C	0.03	0.02	0.01	0.00	0.06	0.09	0.15	40	0.05	0.01	5.8	5.2	4.4	---
-4	145-203	C	0.01	0.00	0.01	0.00	0.02	0.13	0.15	13	0.02	0.01	5.9	5.5	4.9	---
Astatula sand:																
S81FL-55-01-1	0-20	Ap	1.22	0.30	0.01	0.04	1.57	0.90	2.47	64	0.29	0.03	4.9	5.0	4.9	---
-2	20-84	C	0.30	0.16	0.01	0.02	0.49	0.75	1.24	40	0.08	0.02	5.1	5.1	5.3	---
-3	84-147	C	0.20	0.13	0.02	0.02	0.37	0.82	1.19	31	0.07	0.02	5.0	5.1	5.3	---
-4	147-203	C	0.06	0.05	0.02	0.02	0.15	1.27	1.42	11	0.08	0.02	4.8	4.8	4.5	---
Basinger fine sand:																
S85FL-55-17-1	0-15	Ap	0.63	0.07	0.02	0.01	0.73	1.25	1.98	37	0.38	0.03	5.9	4.6	4.7	---
-2	15-41	E1	0.20	0.02	0.01	0.00	0.23	0.55	0.78	29	0.14	0.00	6.1	5.2	5.1	---
-3	41-53	E2	0.30	0.05	0.02	0.00	0.37	1.67	2.04	18	0.18	0.00	5.9	5.0	4.6	---
-4	53-76	Bh/E	0.25	0.06	0.01	0.01	0.33	2.18	2.51	13	0.11	0.00	5.8	5.1	4.5	---
-5	76-132	Bh/E	0.23	0.12	0.03	0.01	0.39	2.92	3.31	12	0.23	0.00	5.6	4.9	4.3	---
-6	132-157	C1	0.33	0.25	0.10	0.02	0.70	2.08	2.78	25	0.12	0.00	5.2	4.6	4.1	---
-7	157-203	C2	0.47	1.60	0.05	0.04	2.16	3.38	5.54	39	0.02	0.00	4.4	3.9	3.2	---
Bradenton fine sand:																
S84FL-55-12-1	0-10	Ap	4.26	0.82	0.25	0.18	5.51	4.66	10.17	54	2.12	0.18	5.2	4.8	5.2	---
-2	10-36	C	0.44	0.11	0.12	0.03	0.70	0.67	1.37	51	0.15	0.11	5.2	5.2	5.6	---
-3	36-74	Btg	17.50	3.70	3.42	0.24	24.86	5.22	30.08	83	0.16	0.09	8.0	7.5	7.6	---
-4	74-112	Btkg	30.56	5.96	0.99	0.04	37.55	3.32	40.87	92	0.09	0.17	8.1	7.6	7.8	---
-5	112-152	Ckg1	22.06	3.29	0.40	0.04	25.79	2.14	27.93	92	0.07	0.13	8.1	7.5	8.1	---
-6	152-203	Ckg2	29.25	6.07	0.79	0.54	36.65	2.96	39.61	93	0.13	0.18	7.8	7.7	8.0	---
Chobee fine sandy loam:																
S85FL-55-20-1	0-8	A	10.75	3.13	0.20	0.17	14.25	27.09	41.34	34	7.72	0.00	4.7**	4.4	3.8	---
-2	8-46	A	12.25	3.04	0.12	0.03	15.44	8.84	24.28	64	1.24	0.03	5.3	4.9	4.5	---
-3	46-91	Btg1	16.50	4.11	0.11	0.02	20.74	7.09	27.83	75	0.07	0.04	6.5	5.5	4.9	---
-4	91-145	Btg2	13.75	2.67	0.11	0.02	16.55	5.46	22.01	75	0.06	0.00	6.6	5.9	5.1	---
-5	145-203	Cg	6.30	0.90	0.08	0.15	7.43	1.50	8.93	83	0.03	0.00	7.8	6.8	7.5	---

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon *	Electrical conductivity	pH **: H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	Pyrop extr: C
	Cm		--Milliequivalents/100 grams of soil--							Pct	Pct	Mmhos/cm				Pct
Daytona sand:																
S82FL-55-04-1	0-8	A	0.99	0.25	0.04	0.02	1.30	5.13	6.43	20	1.13	0.03	4.2	3.8	3.6	---
-2	8-91	E	0.01	0.01	0.01	0.00	0.03	1.21	1.24	2	0.06	0.02	5.3	4.0	3.7	---
-3	91-114	Bh	0.02	0.02	0.03	0.00	0.07	5.98	6.05	1	0.49	0.03	4.6	3.9	3.8	0.31
-4	114-150	BC	0.02	0.01	0.01	0.00	0.04	2.16	2.20	2	0.20	0.01	4.8	4.3	4.1	---
-5	150-203	C	0.01	0.01	0.01	0.00	0.03	1.32	1.35	2	0.13	0.01	4.9	4.6	4.4	---
Duette sand:																
S82FL-55-03-1	0-15	A	0.34	0.11	0.04	0.01	0.50	4.19	4.69	11	0.75	0.03	4.4	3.6	3.3	---
-2	15-46	E1	0.02	0.01	0.01	0.00	0.04	0.65	0.69	6	0.10	0.01	4.8	4.1	4.1	---
-3	46-130	E2	0.03	0.02	0.01	0.00	0.06	0.62	0.68	9	0.05	0.01	4.8	4.6	4.5	---
-4	130-150	Bh	0.04	0.02	0.01	0.00	0.07	6.47	6.54	1	0.52	0.01	4.4	4.2	3.9	0.38
-5	150-203	BC	0.04	0.02	0.02	0.00	0.08	2.75	2.83	3	0.20	0.01	4.5	4.3	4.3	---
EauGallie fine sand:																
S85FL-55-19-1	0-10	Ap	0.14	0.07	0.05	0.02	0.28	3.61	3.89	7	1.02	0.00	4.2**	3.4	2.8	---
-2	10-41	E1	0.07	0.04	0.02	0.00	0.13	0.65	0.78	17	0.05	0.00	4.9	3.9	3.3	---
-3	41-66	E2	0.03	0.02	0.01	0.00	0.06	0.48	0.54	11	0.05	0.00	5.2	4.3	3.8	---
-4	66-84	Bh1	0.07	0.14	0.05	0.00	0.26	12.50	12.76	2	0.69	0.00	4.6	4.0	3.4	1.06
-5	84-102	Bh2	0.08	0.23	0.07	0.00	0.38	15.73	16.11	2	1.26	0.00	4.8	4.1	3.6	1.24
-6	102-135	Btg	0.45	2.22	0.17	0.02	2.86	5.21	8.07	35	0.21	0.00	4.8	4.0	3.3	---
-7	135-203	BCg	0.59	2.51	0.18	0.03	3.31	4.07	7.38	45	0.34	0.00	4.6	3.9	3.1	---
Felda fine sand																
S84FL-55-10-1	0-18	Ap	0.75	0.24	0.10	0.05	1.14	7.10	8.24	14	1.33	0.10	3.8**	3.7	3.9	---
-2	18-36	Eg1	0.14	0.02	0.04	0.00	0.20	0.53	0.73	27	0.10	0.04	4.6	4.5	3.8	---
-3	36-53	Eg2	0.16	0.03	0.04	0.00	0.23	0.37	0.60	38	0.07	0.03	5.1	5.1	5.5	---
-4	53-61	Eg3	4.21	0.78	0.14	0.02	5.15	2.33	7.48	69	0.18	0.06	5.1	5.1	5.2	---
-5	61-91	Btg	13.37	2.02	0.27	0.09	15.75	2.60	18.35	86	0.08	0.06	5.7	5.8	5.2	---
-6	91-117	Cg1	5.75	0.55	0.15	0.03	6.48	1.43	7.91	82	0.03	0.09	7.6	7.3	7.4	---
-7	117-173	Cg1	11.94	0.37	0.12	0.01	12.44	0.15	12.59	99	0.07	0.09	7.8	7.5	8.2	---
-8	173-203	Cg2	18.00	0.41	0.13	0.02	18.56	0.22	18.78	99	0.06	0.12	7.6	7.5	7.9	---
Hicoria mucky sand:																
S84FL-55-16-1	0-10	A1	14.31	2.12	0.77	0.19	17.39	29.55	46.94	37	10.89	0.17	4.2	4.3	4.5	---
-2	10-38	A2	1.51	0.36	0.23	0.03	2.13	13.32	15.45	14	0.81	0.10	3.5	3.9	3.5	---
-3	38-53	Eg	0.14	0.07	0.06	0.01	0.28	0.59	0.87	32	0.18	0.06	4.1	4.1	4.3	---
-4	53-99	Btg1	4.79	2.78	0.30	0.03	7.90	3.96	11.86	67	0.26	0.06	4.0	3.9	3.7	---
-5	99-132	Btg2	6.04	2.98	0.29	0.03	9.34	5.61	14.96	62	0.26	0.11	3.7	3.8	3.6	---
-6	132-203	BCg	7.87	3.91	0.31	0.04	12.13	5.00	17.13	71	0.16	0.05	3.5	3.8	3.6	---

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon *	Electrical conductivity	pH **: H_2O (1:1)	pH **: $CaCl_2$ 0.1m (1:2)	pH **: KCl in (1:1)	Pyrop extr: C
	Cm		--Milliequivalents/100 grams of soil--							Pct	Pct	Mmhos/cm				Pct
Immokalee sand:																
S84FL-55-14-1	0-15	Ap	3.05	0.41	0.07	0.03	3.56	2.88	6.44	55	0.95	0.15	4.9	4.7	5.1	---
-2	15-36	E1	0.54	0.09	0.02	0.00	0.65	0.62	1.27	51	0.14	0.05	5.6	5.4	6.0	---
-3	36-94	E2	0.15	0.03	0.02	0.00	0.20	0.44	0.64	31	0.03	0.04	5.8	6.7	6.3	---
-4	94-152	Bh1	0.46	0.99	0.24	0.35	2.04	23.14	25.18	8	2.20	0.16	3.5	3.3	3.4	2.63
-5	152-203	Bh2	0.18	0.61	0.12	0.15	1.06	12.76	13.82	8	1.48	0.13	3.3**	3.3	3.3	1.46
Malabar fine sand:																
S84FL-55-11-1	0-10	Ap	3.94	1.17	0.06	0.03	5.20	2.51	7.71	67	1.26	0.08	6.1	6.0	6.0	---
-2	10-36	E	0.24	0.09	0.12	0.12	0.57	0.29	0.86	66	0.08	0.17	5.9	5.9	6.2	---
-3	36-76	Bw1	0.22	0.14	0.04	0.02	0.42	0.09	0.51	84	0.08	0.04	6.0	6.1	6.4	---
-4	76-94	Bw2	0.99	0.18	0.07	0.03	1.27	1.52	2.79	46	0.14	0.04	5.7	5.5	5.6	---
-5	94-112	Bw3	1.69	0.25	0.13	0.05	2.12	2.58	4.70	45	0.14	0.06	5.8	5.6	5.7	---
-6	112-122	Bw4	0.71	0.13	0.07	0.01	0.92	1.02	1.94	47	0.11	0.04	5.5	5.3	5.4	---
-7	122-165	Btg	3.01	0.74	0.19	0.03	3.97	3.14	7.11	56	0.08	0.15	4.2*	4.5	4.3	---
-8	165-203	Btg	5.30	1.60	0.21	0.03	7.14	4.23	11.37	63	0.05	0.11	4.3*	4.8	4.4	---
Orsino sand:																
S82FL-55-05-1	0-5	A	1.16	0.25	0.04	0.00	1.45	7.27	8.72	17	1.79	0.03	4.5	3.5	3.3	---
-2	5-61	E	0.02	0.01	0.01	0.00	0.04	0.33	0.37	11	0.09	0.02	5.3	4.2	3.9	---
-3	61-117	E	0.02	0.01	0.01	0.00	0.04	0.04	0.08	50	0.03	0.02	5.7	4.8	4.4	---
-4	117-168	Bw/Bh	0.02	0.01	0.01	0.00	0.04	3.14	3.18	1	0.32	0.01	4.9	4.4	4.3	0.20
-5	168-203	C	0.02	0.01	0.01	0.00	0.04	1.82	1.86	2	0.19	0.01	5.1	4.8	4.5	---
Paola sand:																
S82FL-55-06-1	0-13	Ap	0.10	0.06	0.01	0.01	0.18	1.30	1.48	12	0.42	0.01	5.1	4.0	3.7	---
-2	13-43	E	0.21	0.03	0.01	0.01	0.26	0.39	0.65	40	0.19	0.02	5.8	5.0	4.7	---
-3	43-68	Bw	0.07	0.04	0.01	0.00	0.12	0.88	1.00	12	0.17	0.02	5.5	4.7	4.4	---
-4	68-107	C1	0.06	0.04	0.01	0.01	0.12	1.03	1.15	10	0.12	0.01	5.4	4.8	4.5	---
-5	107-155	C2	0.03	0.03	0.01	0.00	0.07	0.75	0.82	9	0.06	0.01	5.4	4.9	4.6	---
-6	155-203	C2	0.02	0.02	0.01	0.00	0.05	0.66	0.71	7	0.08	0.01	5.3	4.9	4.6	---

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Mg	Na	K	Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon *	Electrical conductivity	pH **: H_2O (1:1)	$CaCl_2$ 0.1m (1:2)	KCl in (1:1)	Pyrop extr: C
	Cm		--Milliequivalents/100 grams of soil--							Pct	Pct	Mmhos/cm				Pct
Placid fine sand:																
S85FL-55-23-1	0-8	A	0.30	0.49	0.22	0.08	1.09	18.26	19.35	6	7.01	0.00	4.2	3.7	3.4	---
-2	8-28	A	0.03	0.06	0.04	0.00	0.13	3.15	3.28	4	0.85	0.00	5.0	5.0	3.7	---
-3	28-96	Cg1	0.02	0.03	0.01	0.00	0.06	1.09	1.15	5	0.18	0.00	6.1	4.3	4.0	---
-4	96-124	Cg2	0.21	0.32	0.07	0.00	0.60	1.54	2.14	28	0.29	0.00	5.6	4.3	4.1	---
-5	124-145	Cg3	0.25	0.30	0.10	0.00	0.65	1.51	2.16	30	0.27	0.00	6.1	4.6	4.2	---
-6	145-203	Cg4	0.21	0.26	0.09	0.00	0.56	2.32	2.88	19	0.33	0.00	5.8	4.5	4.3	---
Pomello sand:																
S85FL-55-22-1	0-10	A	0.18	0.12	0.05	0.01	0.36	0.93	1.29	28	0.49	0.00	5.5	3.4	3.5	---
-2	10-76	E	0.02	0.02	0.01	0.00	0.05	0.51	0.56	9	0.01	0.01	5.6	4.9	4.1	---
-3	76-142	E	0.01	0.02	0.01	0.00	0.04	0.24	0.28	14	0.02	0.01	5.2	5.2	4.3	---
-4	142-157	Bh	0.03	0.02	0.03	0.00	0.08	7.92	8.00	1	0.93	0.03	4.9	3.8	3.8	0.90
-5	157-203	BC	0.02	0.10	0.02	0.00	0.14	1.93	2.07	7	0.28	0.02	5.9	4.3	4.2	---
St. Lucie sand:																
S82FL-55-07-1	0-15	A	0.19	0.04	0.01	0.01	0.25	1.09	1.34	19	0.37	0.02	5.2	3.9	3.6	---
-2	15-79	C	0.01	0.01	0.01	0.00	0.03	0.19	0.22	14	0.11	0.01	5.5	4.3	4.0	---
-3	79-142	C	0.02	0.01	0.01	0.00	0.04	0.08	0.12	33	0.09	0.01	5.7	5.2	4.7	---
-4	142-203	C	0.01	0.01	0.01	0.00	0.03	0.23	0.26	12	0.10	0.01	5.9	5.6	5.0	---
Satellite sand:																
S85FL-55-21-1	0-10	A	0.19	0.11	0.01	0.01	0.32	1.61	1.93	17	0.45	0.00	4.6	3.7	3.3	---
-2	10-66	C1	0.02	0.02	0.00	0.00	0.04	0.88	0.92	4	0.04	0.00	5.4	4.3	3.9	---
-3	66-127	C2	0.03	0.02	0.01	0.00	0.06	0.40	0.46	13	0.02	0.00	5.6	4.7	4.1	---
-4	127-203	C2	0.01	0.01	0.00	0.00	0.02	0.47	0.49	4	0.01	0.00	7.0	5.5	4.1	---
Smyrna sand:																
S84FL-55-15-1	0-13	Ap	5.55	0.70	0.14	0.06	6.45	3.12	9.57	67	1.42	0.19	5.6	5.6	5.9	---
-2	13-38	E	0.46	0.03	0.04	0.01	0.54	0.47	1.01	53	0.14	0.06	5.0	4.9	5.5	---
-3	38-46	Bh1	2.79	0.19	0.18	0.13	3.29	21.88	25.17	13	2.68	0.09	4.2	4.2	4.3	1.99
-4	46-56	Bh2	0.96	0.07	0.12	0.04	1.19	13.87	15.06	8	1.09	0.09	4.1	4.3	4.5	1.00
-5	56-89	BC	0.13	0.03	0.06	0.01	0.23	2.72	2.95	8	0.19	0.06	4.6	4.6	4.8	---
-6	89-114	C1	0.18	0.04	0.06	0.02	0.30	1.94	2.24	13	0.20	0.06	4.5	4.7	4.8	---
-7	114-142	C2	0.52	0.12	0.10	0.06	0.80	4.44	5.24	15	0.20	0.07	4.9	4.6	4.8	---
-8	142-203	C3	0.14	0.08	0.06	0.01	0.29	0.61	0.90	32	0.06	0.04	4.4	4.4	4.7	---

See footnotes at end of table.

TABLE 18.--CHEMICAL ANALYSES OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Extractable bases: Ca	Extractable bases: Mg	Extractable bases: Na	Extractable bases: K	Extractable bases: Sum	Extractable acidity	Sum of cations	Base saturation	Organic carbon *	Electrical conductivity	pH **: H_2O (1:1)	pH **: $CaCl_2$ 0.1m (1:2)	pH **: KCl in (1:1)	Pyrop extr: C
	Cm		--Milliequivalents/100 grams of soil--							Pct	Pct	Mmhos/cm				Pct
Tavares sand:																
S82FL-55-02-1	0-15	Ap	1.96	0.55	0.02	0.04	2.57	1.26	3.83	67	0.56	0.06	5.4	5.5	5.7	---
-2	15-91	C1	0.10	0.05	0.01	0.01	0.17	1.22	1.39	12	0.12	0.02	5.4	5.3	4.9	---
-3	91-117	C2	0.08	0.07	0.01	0.01	0.17	1.04	1.21	14	0.07	0.01	5.3	5.1	4.8	---
-4	117-142	C3	0.03	0.02	0.01	0.01	0.07	0.97	1.04	7	0.05	0.01	5.0	4.8	4.6	---
-5	142-203	C4	0.04	0.12	0.01	0.00	0.07	0.62	0.69	10	0.04	0.01	5.1	4.8	4.6	---
Valkaria fine sand:																
S84FL-55-09-1	0-13	Ap	1.51	0.09	0.14	0.02	1.76	1.55	3.31	53	0.71	0.08	5.5	5.0	6.0	---
-2	13-28	E1	0.32	0.02	0.05	0.00	0.39	0.41	0.80	49	0.16	0.05	5.3	4.9	5.7	---
-3	28-41	E2	0.18	0.01	0.04	0.00	0.23	0.10	0.33	70	0.02	0.03	5.6	5.9	6.4	---
-4	41-84	Bw1	0.49	0.08	0.11	0.01	0.69	0.59	1.28	54	0.03	0.04	5.8	6.1	6.8	---
-5	84-130	Bw2	0.12	0.02	0.06	0.00	0.20	0.93	1.13	18	0.04	0.08	2.9**	3.6	3.8	---
-6	130-203	C	0.26	0.05	0.10	0.00	0.41	0.40	0.81	51	0.03	0.16	4.0**	4.4	4.7	---

* Some of this data might be slightly outside of the properties given in table 14. The original concept has at this time because of the small amount of data available.

** The laboratory pH is too low for the present range of the series. Field reaction was used in the series d

TABLE 19.--CLAY MINERALOGY OF SELECTED SOILS

Soil name and sample number	Depth	Horizon	Clay minerals: Montmorillonite	14 Angstrom intergrage	Kaolinite	Gibbiste	Quartz
	Cm		Pct	Pct	Pct	Pct	Pct
Achbold sand:							
82FL-55-08-1	0-8	A	13	0	7	0	80
-4	145-203	C	7	0	10	0	83
Atatula sand:							
S81FL-55-01-1	0-20	Ap	14	35	39	0	12
-4	147-203	C	18	42	34	0	6
Basinger fine sand:							
S85FL-55-17-1	0-15	Ap	32	0	14	0	54
-4	53-76	Bh/E	12	15	10	0	63
-7	157-203	C2	13	0	75	0	12
Bradenton fine sand:							
S84FL-55-12-1	0-10	Ap	88	0	2	0	10
-3	36-74	Btg	98	0	0	0	2
-6	152-203	Ckg2	90	0	5	0	5
Chobee fine sandy loam:							
S85FL-55-20-2	8-46	A	98	0	0	0	2
-3	46-91	Btg1	97	0	1	0	2
-5	145-203	Cg	95	0	2	0	3
Daytona sand:							
S82FL-55-04-1	0-8	A	49	9	16	0	26
-3	91-114	Bh	18	19	41	0	22
-5	150-203	C	15	27	44	0	14
Duette sand:							
S82FL-55-03-1	0-15	A	13	11	62	0	14
-4	130-150	Bh	0	21	35	0	44
-5	150-203	BC	16	26	35	0	23
EauGallie fine sand:							
S85FL-55-19-1	0-10	Ap	0	0	13	0	87
-4	66-84	Bh1	40	0	16	0	44
-6	102-135	Btg	8	0	87	0	5
-7	135-203	BCg	0	0	90	0	10
Felda fine sand:							
S84FL-55-10-1	0-18	Ap	40	0	0	0	60
-5	61-91	Btg	93	0	2	0	5
-7	117-173	Cg1	91	0	3	0	6
-8	173-203	Cg2	69	0	17	0	14
Hicoria mucky sand:							
S84FL-55-16-1	0-10	A1	78	0	7	0	15
-4	53-99	Btg1	94	0	3	0	3
-6	132-203	BCg	94	0	3	0	3
Immokalee sand:							
S84FL-55-14-1	0-15	Ap	0	0	13	0	87
-4	94-152	Bh1	0	0	6	0	94

See footnotes at end of table.

TABLE 19.--CLAY MINERALOGY OF SELECTED SOILS--Continued

Soil name and sample number	Depth	Horizon	Clay minerals				
			Montmorillonite	14 Angstrom intergrage	Kaolinite	Gibbiste	Quartz
	Cm		Pct	Pct	Pct	Pct	Pct
Malabar fine sand:							
S84FL-55-11-1	0-10	Ap	0	0	0	0	100
-3	36-76	Bw1	0	9	5	0	86
-7	122-165	Btg	25	13	39	0	23
-8	165-203	Btg	0	0	77	0	23
Orsino sand:							
S82FL-55-05-1	0-5	A	27	8	8	0	57
-4*	117-168	Bw/Bh	0	24	47	0	29
-5	168-203	C	0	26	44	0	30
Paola sand:							
S82FL-55-06-1	0-13	Ap	29	12	37	0	22
-3	43-68	Bw	11	17	47	0	25
-6	155-203	C2	7	24	60	0	9
Placid fine sand:							
S85FL-55-23-2	8-28	A	21	33	19	0	27
-4	96-124	Cg2	14	36	31	0	19
-6	145-203	Cg4	7	20	20	33	20
Pomello sand:							
S85FL-55-22-1	0-10	A	33	10	16	0	41
-4	142-157	Bh	12	7	4	0	77
-5	157-203	BC	21	8	10	0	65
St. Lucie sand:							
S82FL-55-07-1*	0-15	A	20	8	9	0	63
-4**	142-203	C	0	5	6	0	89
Satellite sand:							
S85FL-55-21-1	0-10	A	42	0	23	0	35
-4	127-203	C2	10	0	6	0	84
Smyrna sand:							
S84FL-55-15-1	0-13	Ap	0	0	0	0	100
-3	38-46	Bh1	0	16	19	0	65
-7	114-142	C2	0	12	27	22	39
-8	142-203	C3	0	8	24	50	18
Tavares sand:							
S82FL-55-02-1	0-15	Ap	17	29	36	0	18
-4	117-142	C3	21	39	24	0	16
-5	142-203	C4	17	39	38	0	7
Valkaria fine sand:							
S84FL-55-09-1	0-13	Ap	17	0	4	0	79
-4	41-84	Bw1	0	0	0	0	100
-6	130-203	C	24	24	15	0	37

* Detectable amounts of calcite.
** Detectable amounts of calcite and mica.

TABLE 20.--ENGINEERING INDEX TEST DATA

[Tests performed by the Florida Department of Transportation (FDOT) in cooperation with the U.S. Bureau of Public Roads, in accordance with standard procedures of the American Association of State Highway and Transportation Officials (AASHTO). See the section "Soil Series and Their Morphology" for location of pedon sampled. NP means nonplastic]

Soil name, sample number, horizon, and depth (in inches)	Classification		Mechanical analysis*								Liquid limit	Plasticity index	Moisture density**	
			Percentage smaller than--				Percentage smaller than--							
	AASHTO***	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
											Pct		Lb/ft^3	Pct
Archbold sand: (S82FL-55-08) C --------- 4-80	A-3(0)	SP	100	100	89	1	1	1	0	0	---	NP	99	17
Astatula sand: (S81FL-55-01) C --------- 7-80	A-3(0)	SP	100	100	80	4	3	2	2	1	---	NP	103	14
Basinger fine sand: (S85FL-55-17) Bh/E ----- 21-52	A-3(0)	SP-SM	100	100	96	9	5	2	0	0	---	NP	110	13
Bradenton fine sand: (S84FL-55-12) Btgk ----- 29-44	A-2-4(0)	SM	100	100	97	26	23	17	13	12	---	NP	110	15
Chobee fine sandy loam: (S85FL-55-20) Btg1 ----- 18-36	A-2-6(0)	SC	100	100	95	30	30	30	27	26	30	15	108	16
Daytona sand: (S82FL-55-04) E --------- 3-36	A-3(0)	SP	100	100	80	1	1	1	1	1	---	NP	100	15
Duette sand: (S82FL-55-03) E2 ------- 18-51	A-3(0)	SP	100	100	87	1	1	1	1	0	---	NP	100	16
EauGallie sand: (S85FL-55-19) Btg1 ----- 40-53	A-2-4(0)	SC	100	100	95	27	24	21	20	20	25	10	111	16
Felda fine sand: (S84FL-55-10) Btg ------ 24-36	A-2-4(0)	SM-SC	100	100	99	27	23	19	15	14	27	5	112	15
Hicoria mucky sand: (S84FL-55-16) Btg2 ----- 39-52	A-2-4(0)	SM	100	100	92	23	20	16	14	14	---	NP	115	14
Immokalle sand: (S84FL-55-14) Bt1 ------ 37-60	A-2-4(0)	SM	100	100	91	14	11	8	5	5	---	NP	108	12
Malabar fine sand: (S84FL-55-11) Btg ------ 48-80	A-2-4(0)	SC	100	100	92	23	22	19	18	17	28	10	118	13

See footnotes at end of table.

TABLE 20.--ENGINEERING INDEX TEST DATA--Continued

Soil name, sample number, horizon, and depth (in inches)	Classification		Mechanical analysis*								Liquid limit	Plasticity index	Moisture density**	
			Percentage smaller than--				Percentage smaller than--							
	AASHTO***	Unified	No. 4	No. 10	No. 40	No. 200	.05 mm	.02 mm	.005 mm	.002 mm			Maximum dry density	Optimum moisture
											Pct		Lb/ft^3	Pct
Oldsmar sand: (S85FL-55-18) Btg ------ 54-60	A-2-4(0)	SM-SC	100	100	91	22	22	21	20	20	24	6	117	13
Orsino sand: (S82FL-55-05) E --------- 2-46	A-3(0)	SP	100	100	88	1	1	1	1	1	---	NP	100	16
Paola sand: (S82FL-55-06) C2 ------- 42-81	A-3(0)	SP	100	100	87	2	2	1	1	1	---	NP	103	14
Placid fine sand: (S85FL-55-23) Cgl ------ 11-23	A-3(0)	SP	100	100	95	4	0	0	0	0	---	NP	104	14
Pomello sand: (S85FL-55-22) E --------- 4-56	A-3(0)	SP	100	100	92	4	0	0	0	0	---	NP	102	14
St. Lucie sand: (S82FL-55-07) C --------- 4-80	A-3(0)	SP	100	100	75	2	2	1	0	0	---	NP	100	17
Satellite sand: (S85FL-55-21) C2 ------- 26-80	A-3(0)	SP	100	100	93	2	0	0	0	0	---	NP	102	14
Tavares sand: (S82FL-55-02) C1 -------- 6-36	A-3(0)	SP	100	100	81	3	3	3	2	1	---	NP	104	14

* Mechanical analyses according to AASHTO designation T88-78. Results by this procedure differ somewhat from those obrained by the soil survey procedure of the Soil Conservation Service (SCS). In the AASHTO procedure, the fine material is analyzed by the hydrometer method and the various grain-size fractions are calculated on the basis of all the material, including that coarser than 2 millimeters in diameter. In the SCS soil survey procedure, the fine material is analyzed by the pipette method, and the material coarser than 2 millimeters in diameter is excluded from the calculations of grain-size fractions. The mechanical analyses used in this table are not suitable for use in naming textural classes for soil.

** Based on AASHTO designation T99-74.

*** Based on AASHTO designation M145-73. Dashes indicate that the test is not applicable.

TABLE 21.--CLASSIFICATION OF THE SOILS

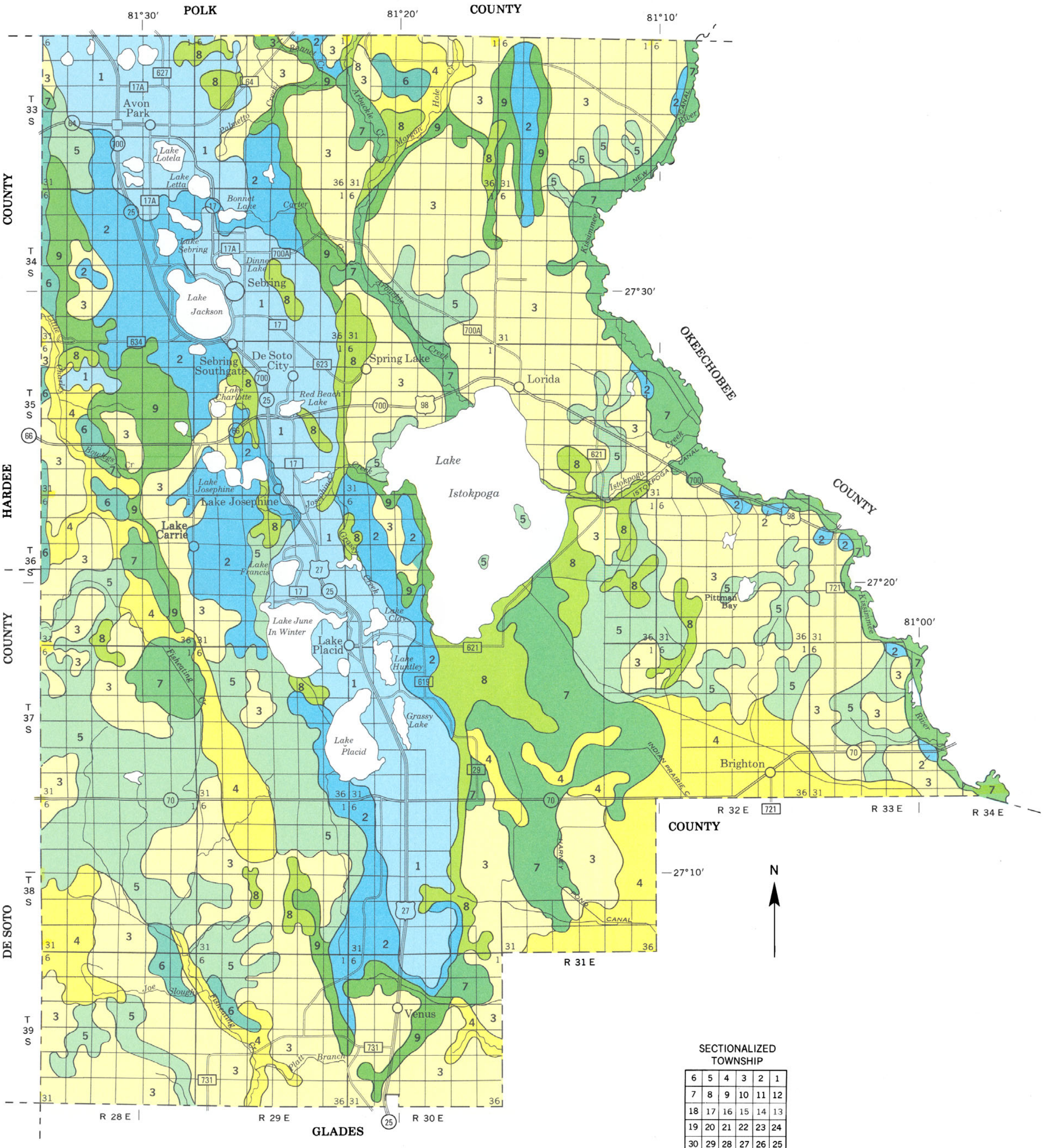
Soil name	Family or higher taxonomic class
Anclote	Sandy, siliceous, hyperthermic Typic Haplaquolls
Archbold	Hyperthermic, uncoated Typic Quartzipsamments
Arents	Arents
Astatula	Hyperthermic, uncoated Typic Quartzipsamments
Basinger	Siliceous, hyperthermic Spodic Psammaquents
Bradenton	Coarse-loamy, siliceous, hyperthermic Typic Ochraqualfs
Brighton	Dysic, hyperthermic Typic Medihemists
Chobee	Fine-loamy, siliceous, hyperthermic Typic Argiaquolls
Daytona	Sandy, siliceous, hyperthermic Entic Haplohumods
Duette	Sandy, siliceous, hyperthermic Grossarenic Entic Haplohumods
EauGallie	Sandy, siliceous, hyperthermic Alfic Haplaquods
Felda	Loamy, siliceous, hyperthermic Arenic Ochraqualfs
Gator	Loamy, siliceous, euic, hyperthermic Terric Medisaprists
Hicoria	Loamy, siliceous, hyperthermic Typic Umbraqualfs
Hontoon	Dysic, hyperthermic Typic Medisaprists
Immokalee	Sandy, siliceous, hyperthermic Arenic Haplaquods
Kaliga	Loamy, siliceous, dysic, hyperthermic Terric Medisaprists
Malabar	Loamy, siliceous, hyperthermic Grossarenic Ochraqualfs
Myakka	Sandy, siliceous, hyperthermic Aeric Haplaquods
Oldsmar	Sandy, siliceous, hyperthermic Alfic Arenic Haplaquods
Orsino	Hyperthermic, uncoated Spodic Quartzipsamments
Paola	Hyperthermic, uncoated Spodic Quartzipsamments
Pineda	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Placid	Sandy, siliceous, hyperthermic Typic Humaquepts
*Pomello	Sandy, siliceous, hyperthermic Arenic Haplohumods
Pomona	Sandy, siliceous, hyperthermic Ultic Haplaquods
St. Johns	Sandy, siliceous, hyperthermic Typic Haplaquods
St. Lucie	Hyperthermic, uncoated Typic Quartzipsamments
Samsula	Sandy or sandy-skeletal, siliceous, dysic, hyperthermic Terric Medisaprists
Sanibel	Sandy, siliceous, hyperthermic Histic Humaquepts
Satellite	Hyperthermic, uncoated Aquic Quartzipsamments
Smyrna	Sandy, siliceous, hyperthermic Aeric Haplaquods
Tavares	Hyperthermic, uncoated Typic Quartzipsamments
Tequesta	Loamy, siliceous, hyperthermic Arenic Glossaqualfs
Valkaria	Siliceous, hyperthermic Spodic Psammaquents

* The soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series.

NRCS Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at http://offices.sc.egov.usda.gov/locator/app.

Each area outlined on this map consists of more than one kind of soil. The map is thus meant for general planning rather than a basis for decisions on the use of specific tracts.



SECTIONALIZED TOWNSHIP

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

LEGEND

SOILS OF THE UPLAND RIDGES

1 — ASTATULA-PAOLA-TAVARES: Nearly level to rolling, excessively drained to moderately well drained, sandy soils

2 — SATELLITE-ARCHBOLD-POMELLO: Nearly level or gently sloping, somewhat poorly drained or moderately well drained sandy soils; some have an organic-stained subsoil

SOILS OF THE FLATWOODS AND SLOUGHS

3 — MYAKKA-IMMOKALEE-SMYRNA: Nearly level, poorly drained, sandy soils that have an organic-stained subsoil

4 — FELDA-HICORIA-MALABAR: Nearly level, poorly drained or very poorly drained, sandy soils that are underlain by loamy material at a depth of 20 to more than 40 inches

5 — BASINGER-VALKARIA-PLACID: Nearly level, poorly drained or very poorly drained, sandy soils

6 — OLDSMAR-EAUGALLIE-POMONA: Nearly level, poorly drained, sandy soils that have an organic-stained subsoil underlain by loamy material

SOILS OF THE SWAMPS AND MARSHES

7 — KALIGA-TEQUESTA-GATOR: Nearly level, very poorly drained soils that have an organic layer underlain by loamy material

8 — SAMSULA-HONTOON-SANIBEL: Nearly level, very poorly drained soils; most are organic and have a sandy substratum; some have a thin, organic surface layer

SOILS OF THE CUTTHROAT SEEPS

9 — BASINGER-ST. JOHNS-PLACID: Nearly level, poorly drained or very poorly drained, sandy soils; some have an organic-stained subsoil

COMPILED 1988

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
UNIVERSITY OF FLORIDA
INSTITUTE OF FOOD AND AGRICULTURAL SCIENCES
AGRICULTURAL EXPERIMENT STATIONS AND SOIL SCIENCE DEPARTMENT
FLORIDA DEPARTMENT OF AGRICULTURE AND CONSUMER SERVICES

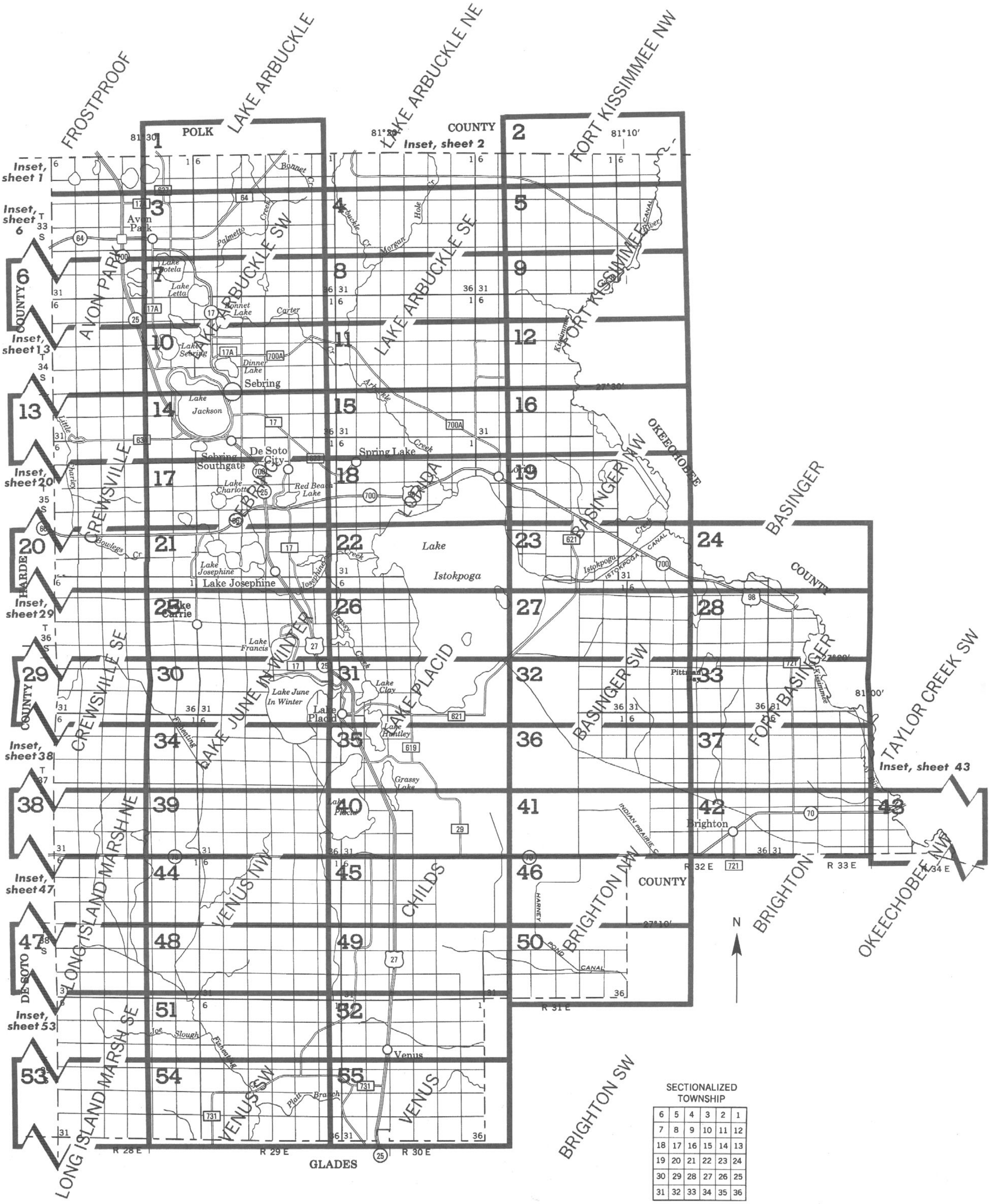
GENERAL SOIL MAP

HIGHLANDS COUNTY, FLORIDA

Scale 1:253,440

1 0 1 2 3 4 Mi

1 0 4 8 Km



INDEX TO MAP SHEETS

HIGHLANDS COUNTY, FLORIDA

Original text from each map sheet:
"This soil survey map was compiled by the U.S. Department of Agriculture, Soil Conservation Service, and cooperating agencies. Base maps are prepared from 1984 - 1985 aerial photography. Coordinate grid tick and land division corners, if shown, are approximately positioned."

SOIL LEGEND

The publication symbols are numbers. Both numeric and alphabetical legends are included. Map unit names without slopes given are on slopes that are less than 2 percent or they are miscellaneous areas.

ALPHABETICAL LIST

SYMBOL	NAME
41	Anclote-Basinger fine sands, frequently flooded
28	Archbold sand, 0 to 5 percent slopes
40	Arents, organic substratum
32	Arents, very steep
9	Astatula sand, 0 to 8 percent slopes
42	Astatula-Urban land complex, 0 to 8 percent slopes
12	Basinger fine sand
3	Basinger fine sand, depressional
33	Basinger, St. Johns, and Placid soils
15	Bradenton fine sand
22	Brighton muck
25	Chobee fine sandy loam, depressional
5	Daytona sand, 0 to 5 percent slopes
4	Duette sand, 0 to 5 percent slopes
38	EauGallie fine sand
13	Felda fine sand
31	Felda fine sand, depressional
23	Gator muck
19	Hicoria mucky sand, depressional
21	Hontoon muck
8	Immokalee sand
18	Kaliga muck
46	Kaliga muck, frequently flooded
17	Malabar fine sand
37	Malabar sand, depressional
10	Myakka fine sand
30	Oldsmar fine sand
11	Orsino sand, 0 to 5 percent slopes
1	Paola sand, 0 to 8 percent slopes
45	Paola-Basinger sands, rolling
24	Pineda sand
7	Placid fine sand, depressional
36	Pomello sand, 0 to 5 percent slopes
29	Pomona sand
20	Samsula muck
35	Sanibel muck
44	Satellite-Basinger-Urban land complex
14	Satellite sand
39	Smyrna sand
2	St. Lucie sand, 0 to 8 percent slopes
6	Tavares sand, 0 to 5 percent slopes
34	Tavares-Basinger-Sanibel complex, rolling
26	Tequesta muck
43	Urban land
16	Valkaria fine sand

NUMERICAL LIST

SYMBOL	NAME
1	Paola sand, 0 to 8 percent slopes
2	St. Lucie sand, 0 to 8 percent slopes
3	Basinger fine sand, depressional
4	Duette sand, 0 to 5 percent slopes
5	Daytona sand, 0 to 5 percent slopes
6	Tavares sand, 0 to 5 percent slopes
7	Placid fine sand, depressional
8	Immokalee sand
9	Astatula sand, 0 to 8 percent slopes
10	Myakka fine sand
11	Orsino sand, 0 to 5 percent slopes
12	Basinger fine sand
13	Felda fine sand
14	Satellite sand
15	Bradenton fine sand
16	Valkaria fine sand
17	Malabar fine sand
18	Kaliga muck
19	Hicoria mucky sand, depressional
20	Samsula muck
21	Hontoon muck
22	Brighton muck
23	Gator muck
24	Pineda sand
25	Chobee fine sandy loam, depressional
26	Tequesta muck
28	Archbold sand, 0 to 5 percent slopes
29	Pomona sand
30	Oldsmar fine sand
31	Felda fine sand, depressional
32	Arents, very steep
33	Basinger, St. Johns, and Placid soils
34	Tavares-Basinger-Sanibel complex, rolling
35	Sanibel muck
36	Pomello sand, 0 to 5 percent slopes
37	Malabar sand, depressional
38	EauGallie fine sand
39	Smyrna sand
40	Arents, organic substratum
41	Anclote-Basinger fine sands, frequently flooded
42	Astatula-Urban land complex, 0 to 8 percent slopes
43	Urban land
44	Satellite-Basinger-Urban land complex
45	Paola-Basinger sands, rolling
46	Kaliga muck, frequently flooded

CONVENTIONAL AND SPECIAL SYMBOLS LEGEND

CULTURAL FEATURES

BOUNDARIES

- National, state or province
- County or parish
- Minor civil division
- Reservation (national forest or park, state forest or park, and large airport)
- Land grant
- Limit of soil survey (label)
- Field sheet matchline and neatline

AD HOC BOUNDARY (label)

- Small airport, airfield, park, oilfield, cemetery, or flood pool (Swift Airport; FLOOD POOL LINE)

STATE COORDINATE TICK

LAND DIVISION CORNER (sections and land grants)

ROADS

- Divided (median shown if scale permits)
- Other roads
- Trail

ROAD EMBLEM & DESIGNATIONS

- Interstate (21)
- Federal (173)
- State (28)
- County, farm or ranch (1283)

RAILROAD

POWER TRANSMISSION LINE (normally not shown)

PIPE LINE (normally not shown)

FENCE (normally not shown)

LEVEES

- Without road
- With road
- With railroad

DAMS

- Large (to scale)
- Medium or Small (water; w)

PITS

- Gravel pit
- Mine or quarry

MISCELLANEOUS CULTURAL FEATURES

- Farmstead, house (omit in urban areas)
- Church
- School
- Indian mound (label) (Indian Mound)
- Located object (label) (Tower)
- Tank (label) (Gas)
- Wells, oil or gas
- Windmill
- Kitchen midden

WATER FEATURES

DRAINAGE

- Perennial, double line
- Perennial, single line
- Intermittent
- Drainage end

Canals or ditches

- Double-line (label) (CANAL)
- Drainage and/or irrigation

LAKES, PONDS AND RESERVOIRS

- Perennial (water; w)
- Intermittent (int; i)

MISCELLANEOUS WATER FEATURES

- Marsh or swamp
- Spring
- Well, artesian
- Well, irrigation
- Wet spot

SPECIAL SYMBOLS FOR SOIL SURVEY

SOIL DELINEATIONS AND SYMBOLS (8; 17)

ESCARPMENTS

- Bedrock (points down slope)
- Other than bedrock (points down slope)

SHORT STEEP SLOPE

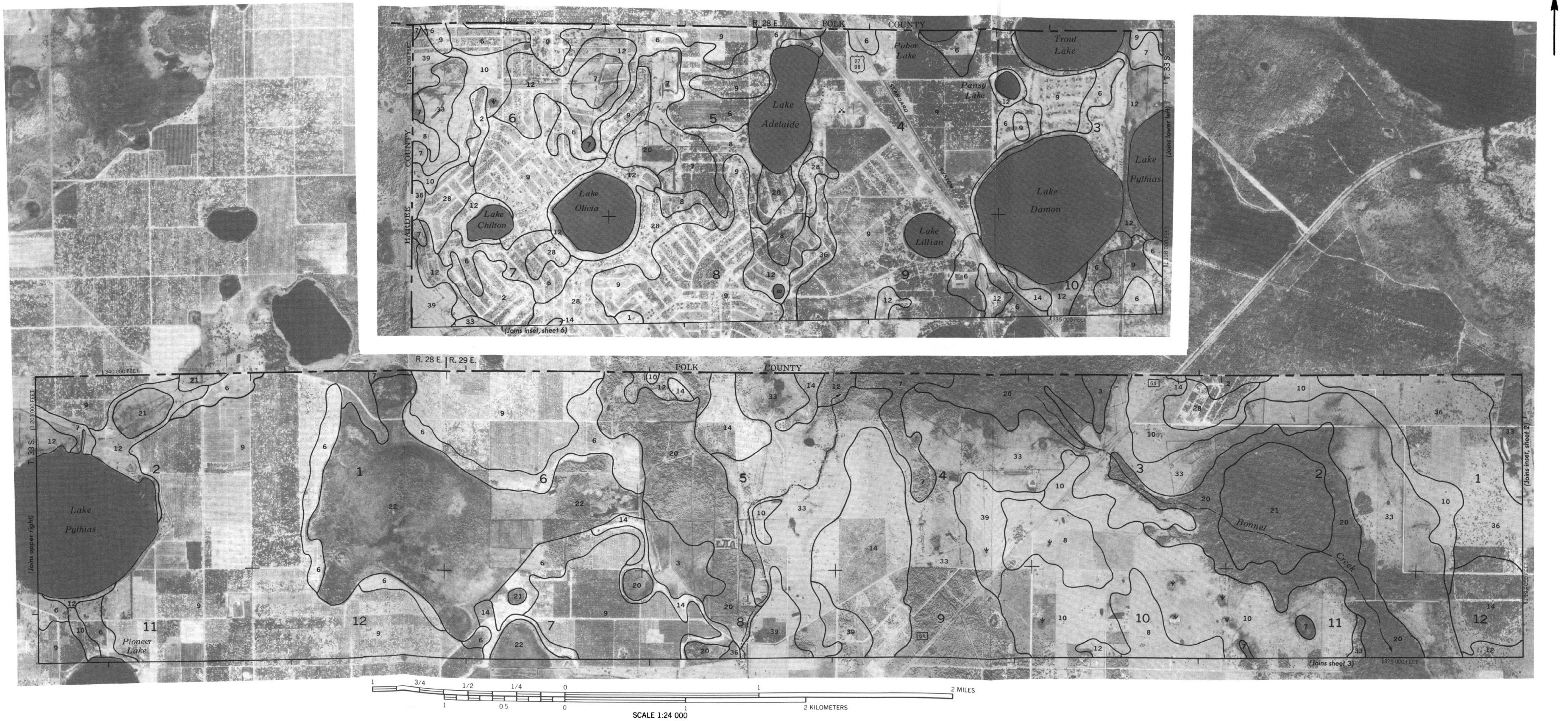
GULLY

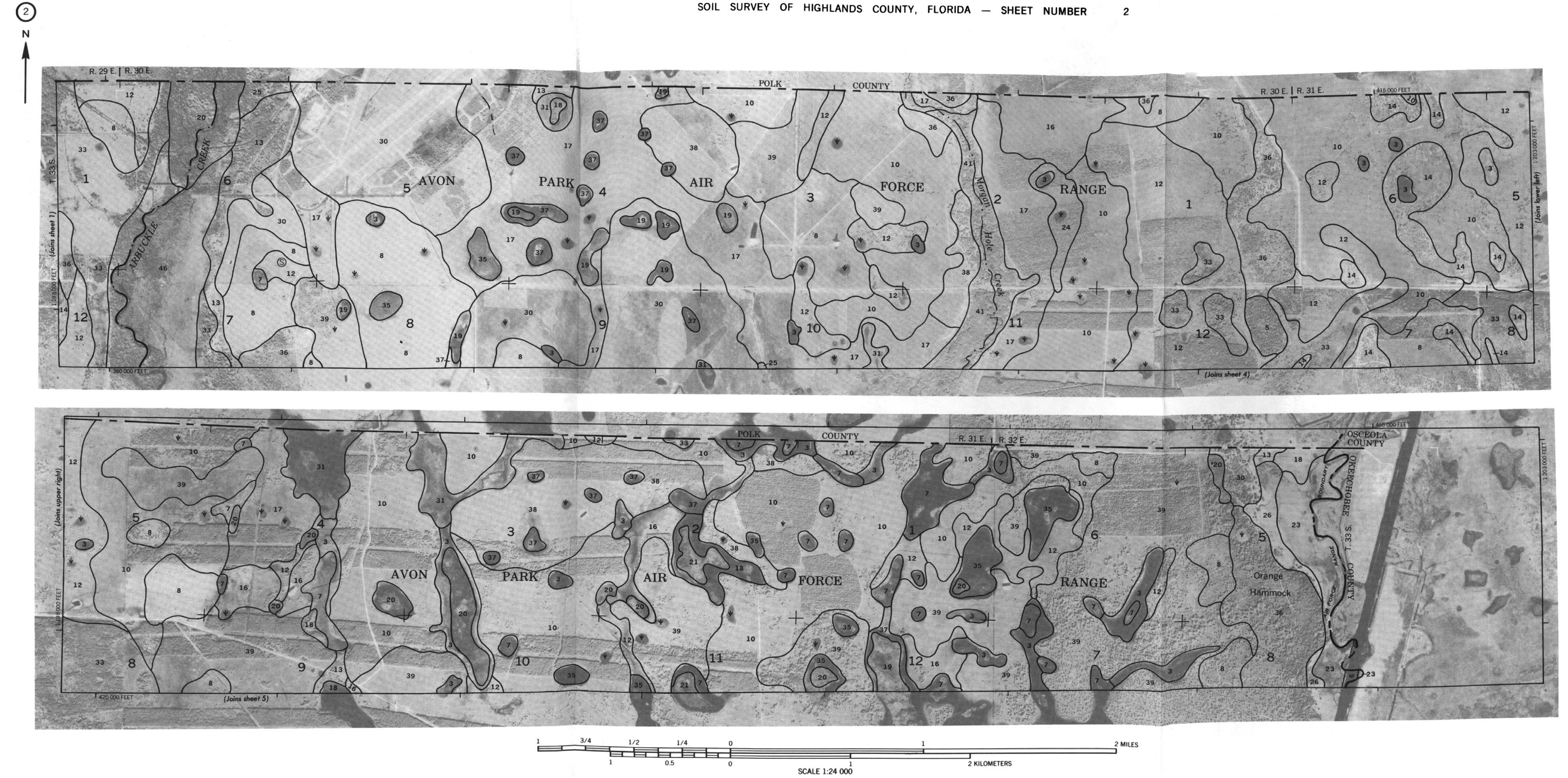
DEPRESSION OR SINK

SOIL SAMPLE (normally not shown)

MISCELLANEOUS

- Blowout
- Clay spot
- Gravelly spot
- Gumbo, slick or scabby spot (sodic)
- Dumps and other similar non soil areas
- Prominent hill or peak
- Rock outcrop (includes sandstone and shale)
- Saline spot
- Sandy spot
- Severely eroded spot
- Slide or slip (tips point upslope)
- Stony spot, very stony spot
- Water areas less than 2 acres

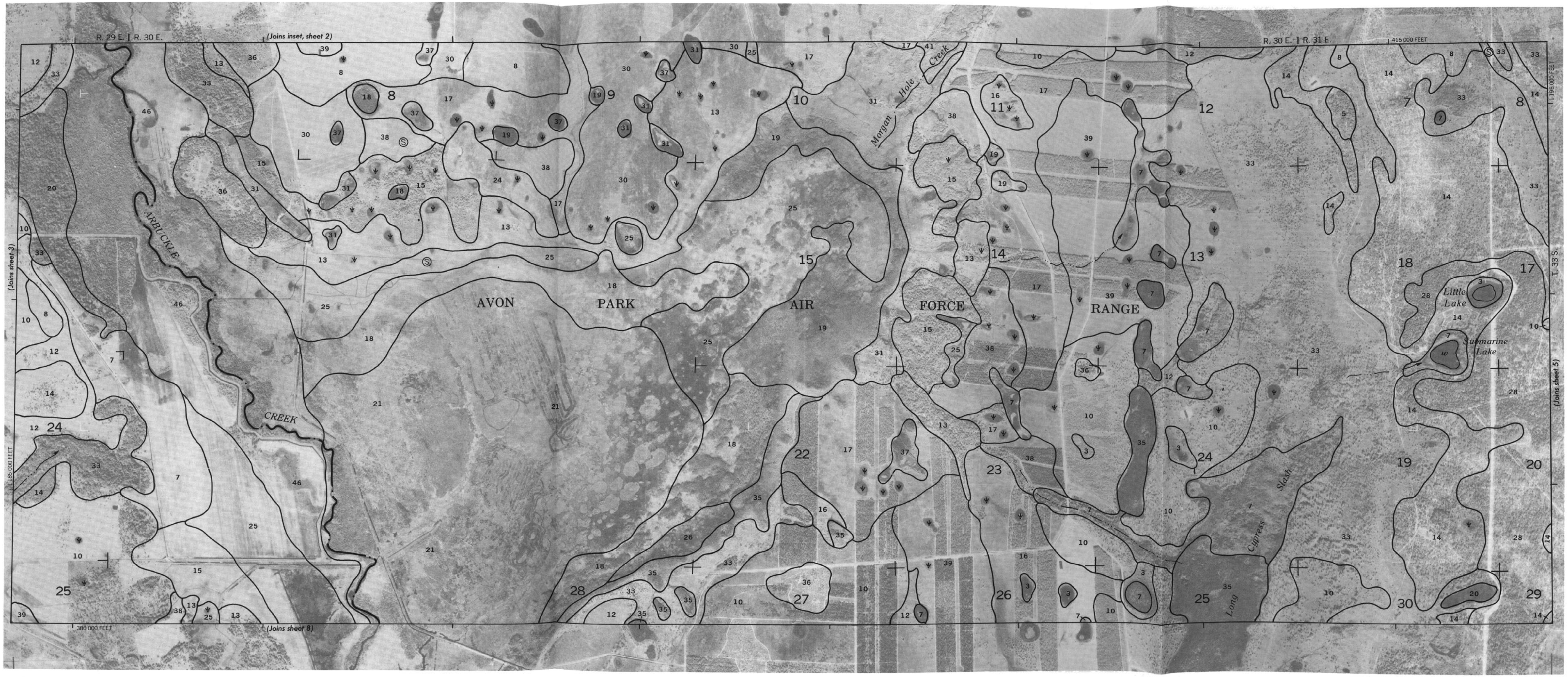

N
POLK COUNTY
HARDEE COUNTY
R. 28 E. | R. 29 E.
T. 33 S.
Lake Adelaide
Lake Olivia
Lake Chilton
Lake Lillian
Lake Damon
Lake Pythias
Trout Lake
Pabor Lake
Pansy Lake
Pioneer Lake
Bonnet Creek
SEABOARD
(Joins inset, sheet 6)
(Joins lower left)
(Joins upper right)
(Joins inset, sheet 2)
(Joins sheet 3)
370 000 FEET
340 000 FEET
335 000 FEET
375 000 FEET
1 203 000 FEET
1 185 000 FEET
1 196 000 FEET
2 MILES
2 KILOMETERS
SCALE 1:24 000



2
N
POLK COUNTY
AVON PARK AIR FORCE RANGE
ARBUCKLE CREEK
Morgan Hole Creek
R. 29 E. R. 30 E.
R. 30 E. R. 31 E.
R. 31 E. R. 32 E.
T. 33 S.
(Joins sheet 1)
(Joins lower left)
(Joins sheet 4)
(Joins upper right)
(Joins sheet 5)
OSCEOLA COUNTY
OKEECHOBEE COUNTY
Orange Hammock
380 000 FEET
415 000 FEET
420 000 FEET
455 000 FEET
1 198 000 FEET
1 203 000 FEET
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000


3
N
R. 28 E. | R. 29 E.
340 000 FEET
(Joins sheet 1)
(Joins sheet 4)
(Joins sheet 7)
(Joins inset, sheet 6)
375 000 FEET
T. 33 S.
Pioneer Lake
Lake Viola
Lake Verona
SANITARY LANDFILL
Duck Lake
Deer Lake
Fox Lake
AVON PARK
Lake Lotela
Lake Angelo
Palmetto
Creek
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

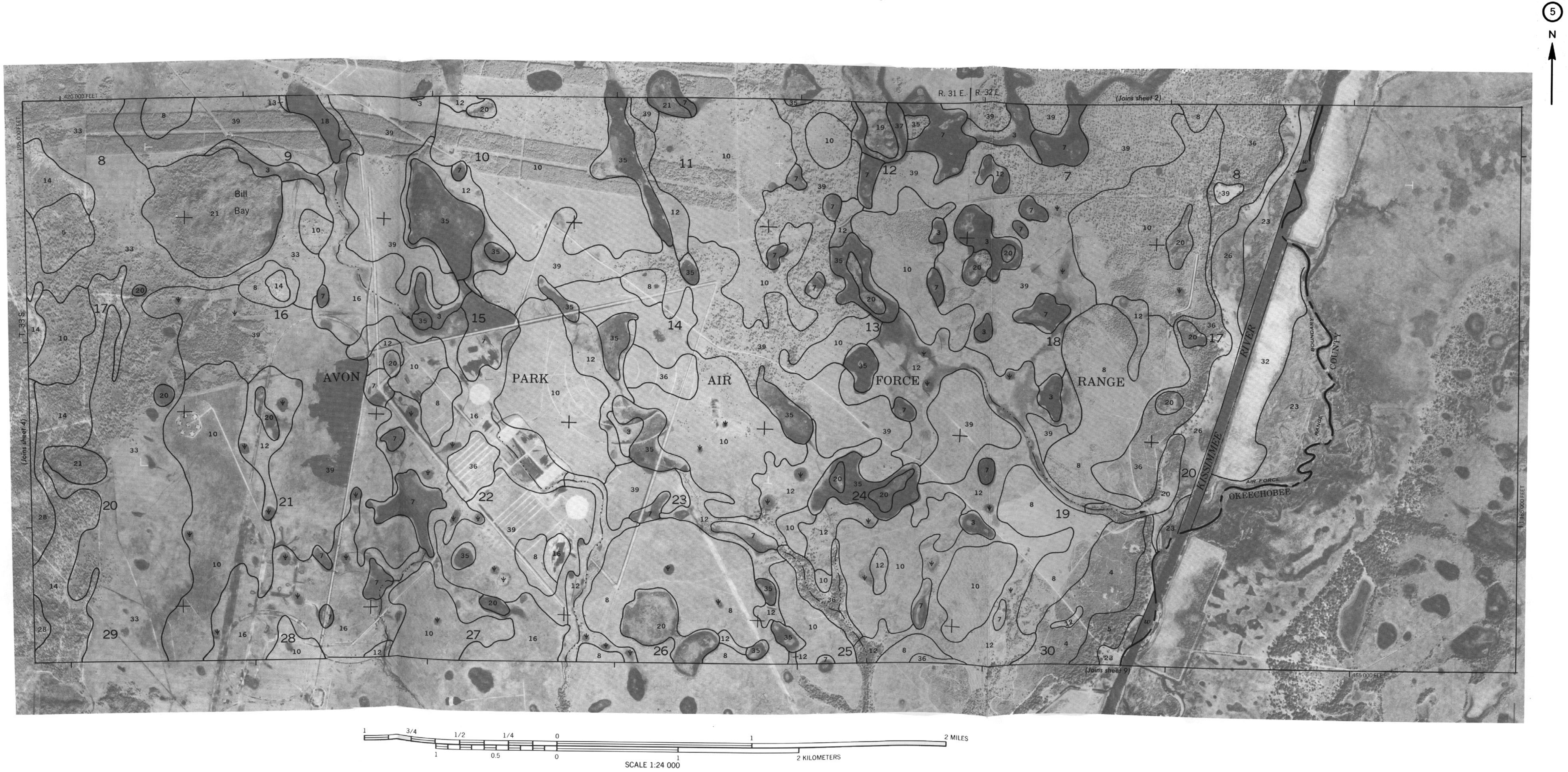
N



1 3/4 1/2 1/4 0 1 2 MILES

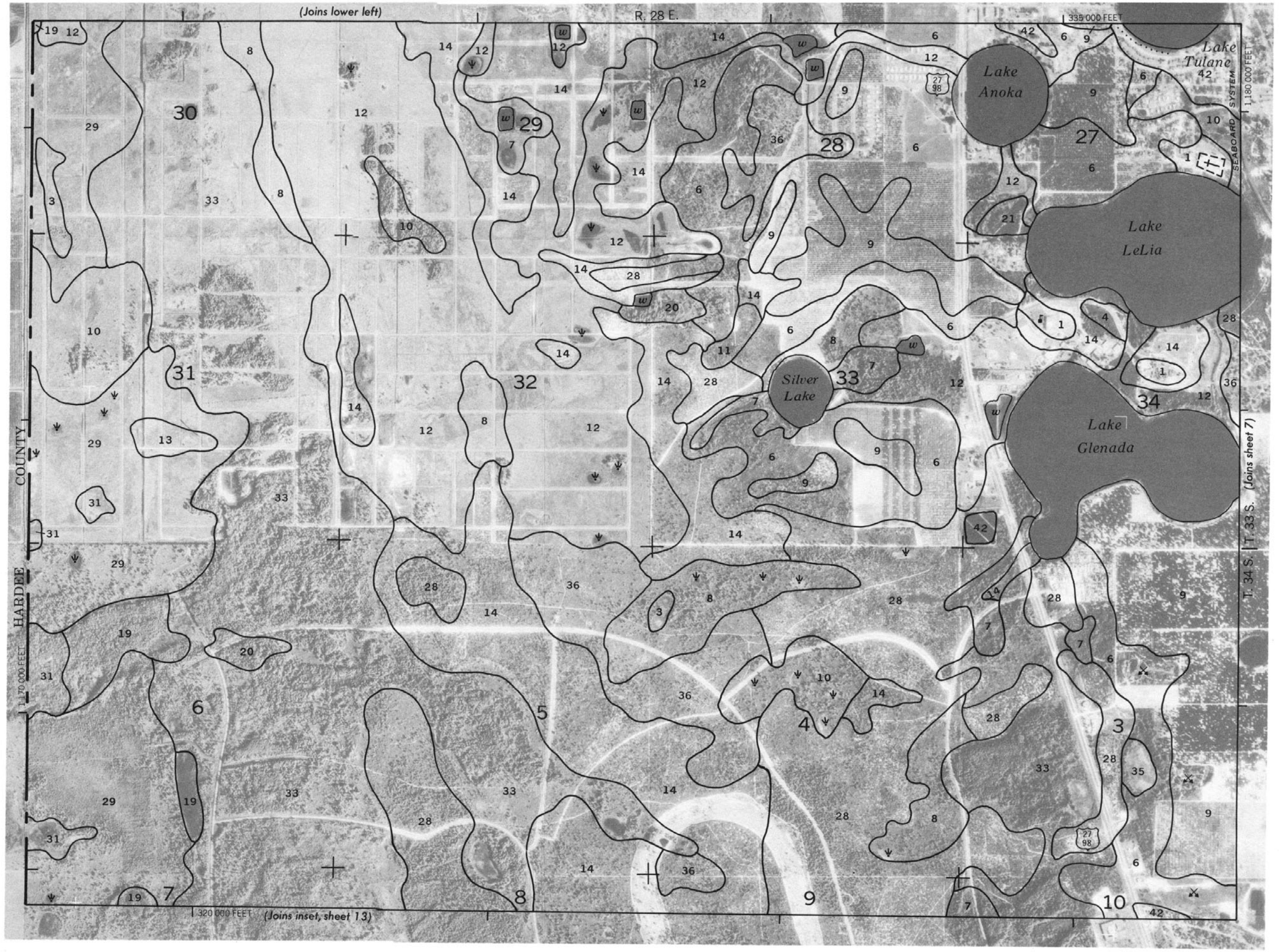
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


5
N
R. 31 E. | R. 32 E.
(Joins sheet 2)
(Joins sheet 4)
(Joins sheet 9)
420 000 FEET
455 000 FEET
T. 33 S.
Bill
Bay
AVON
PARK
AIR
FORCE
RANGE
KISSIMMEE
RIVER
AIR FORCE
OKEECHOBEE
BOUNDARY
RANGE
COUNTY
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

6

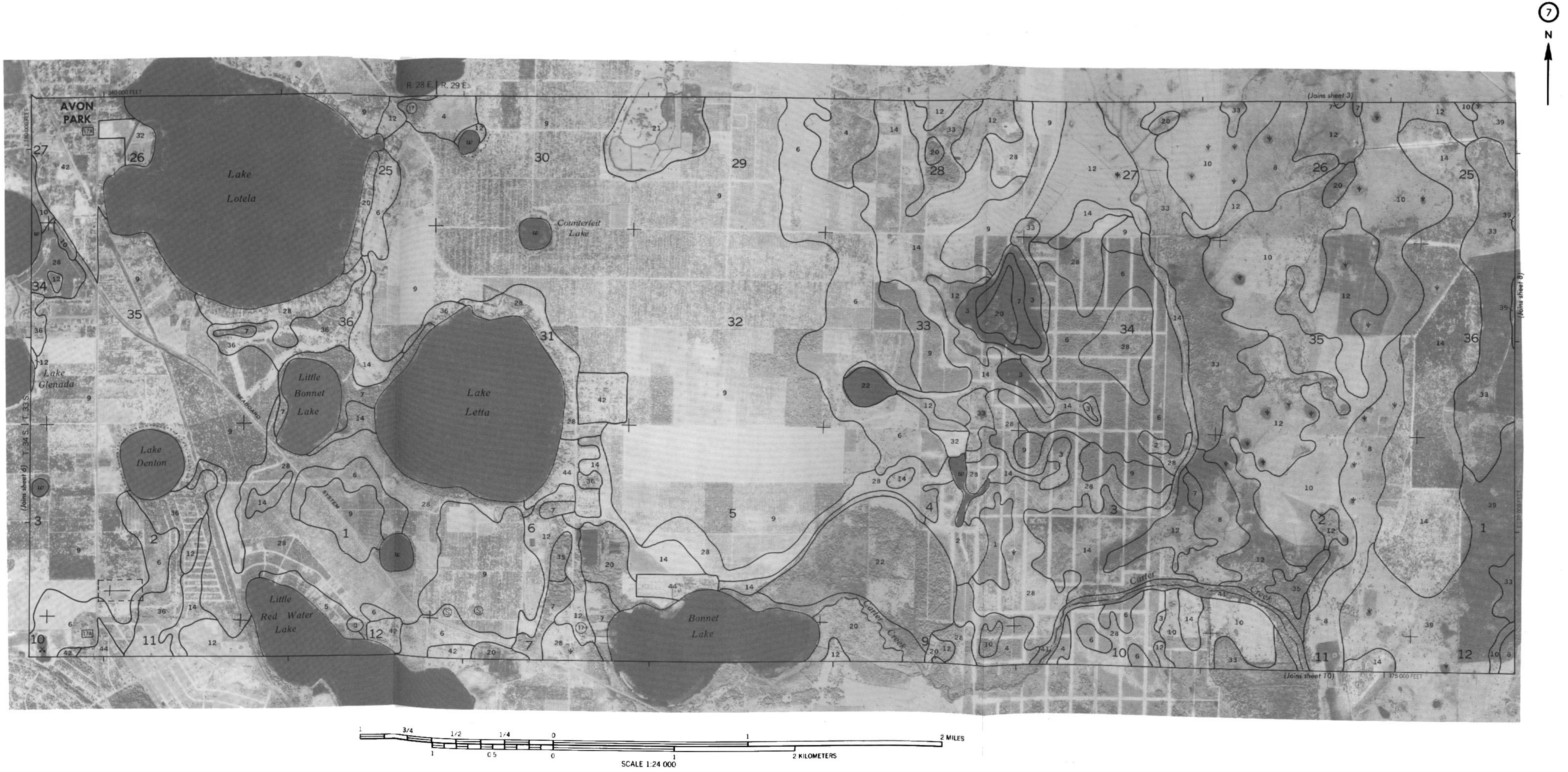
N

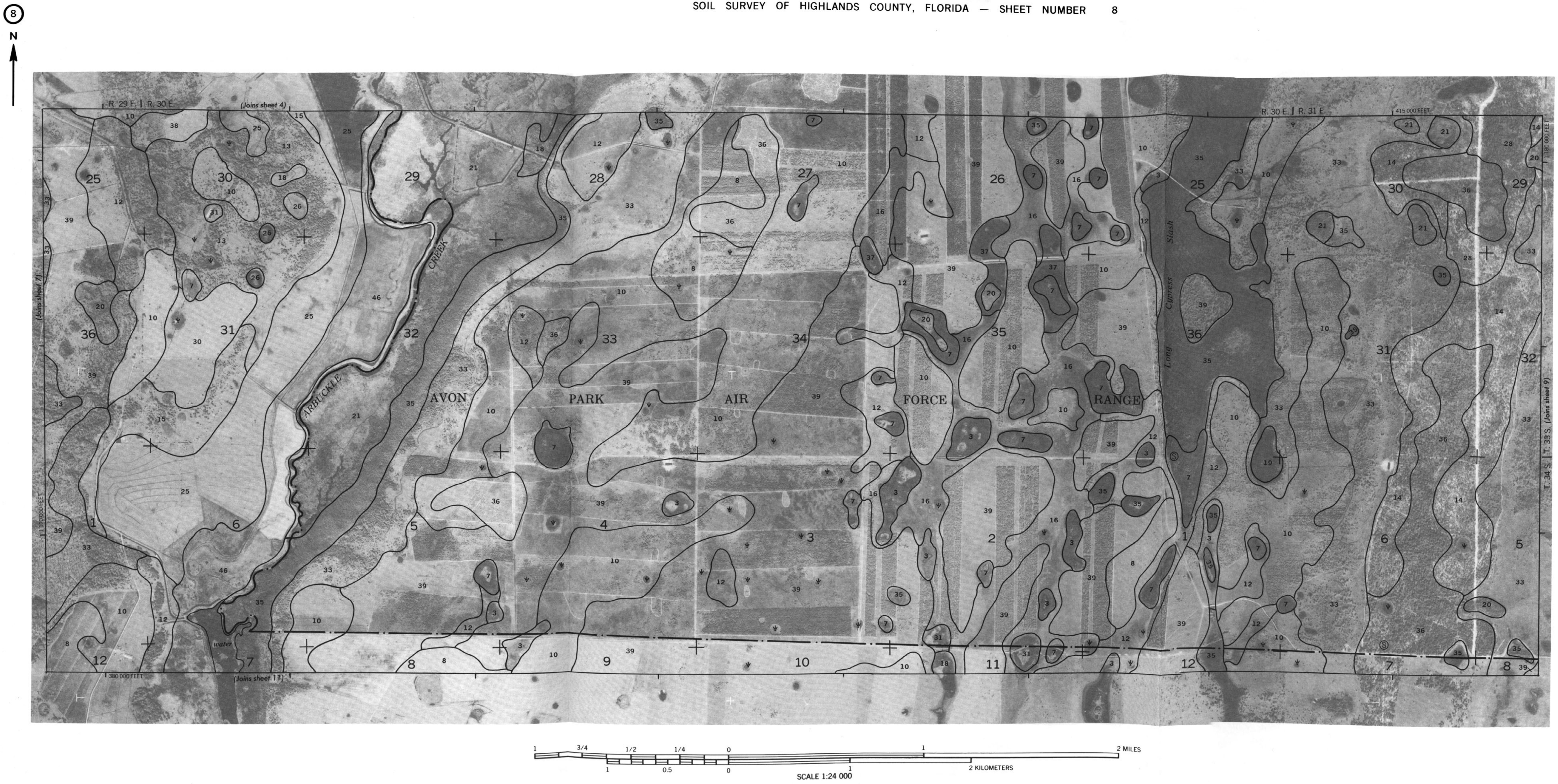


1 3/4 1/2 1/4 0 1 2 MILES

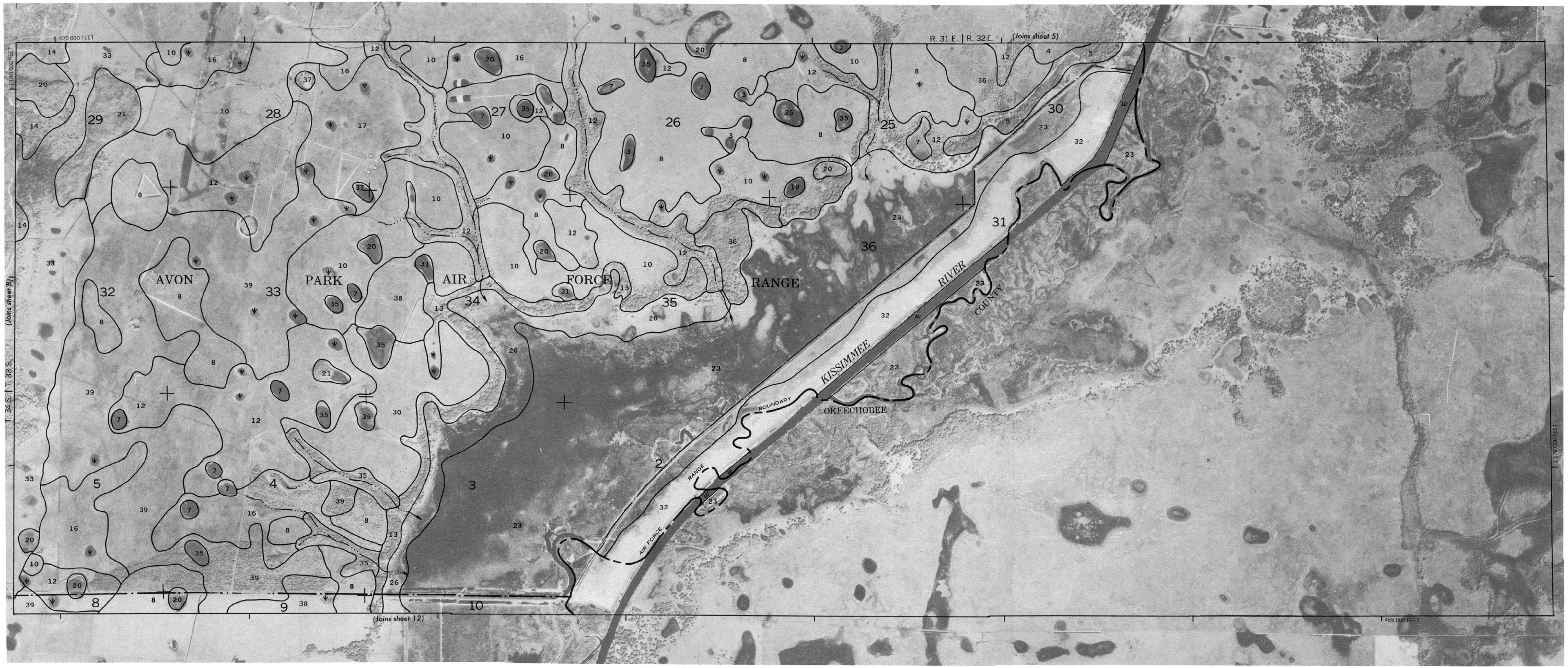
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

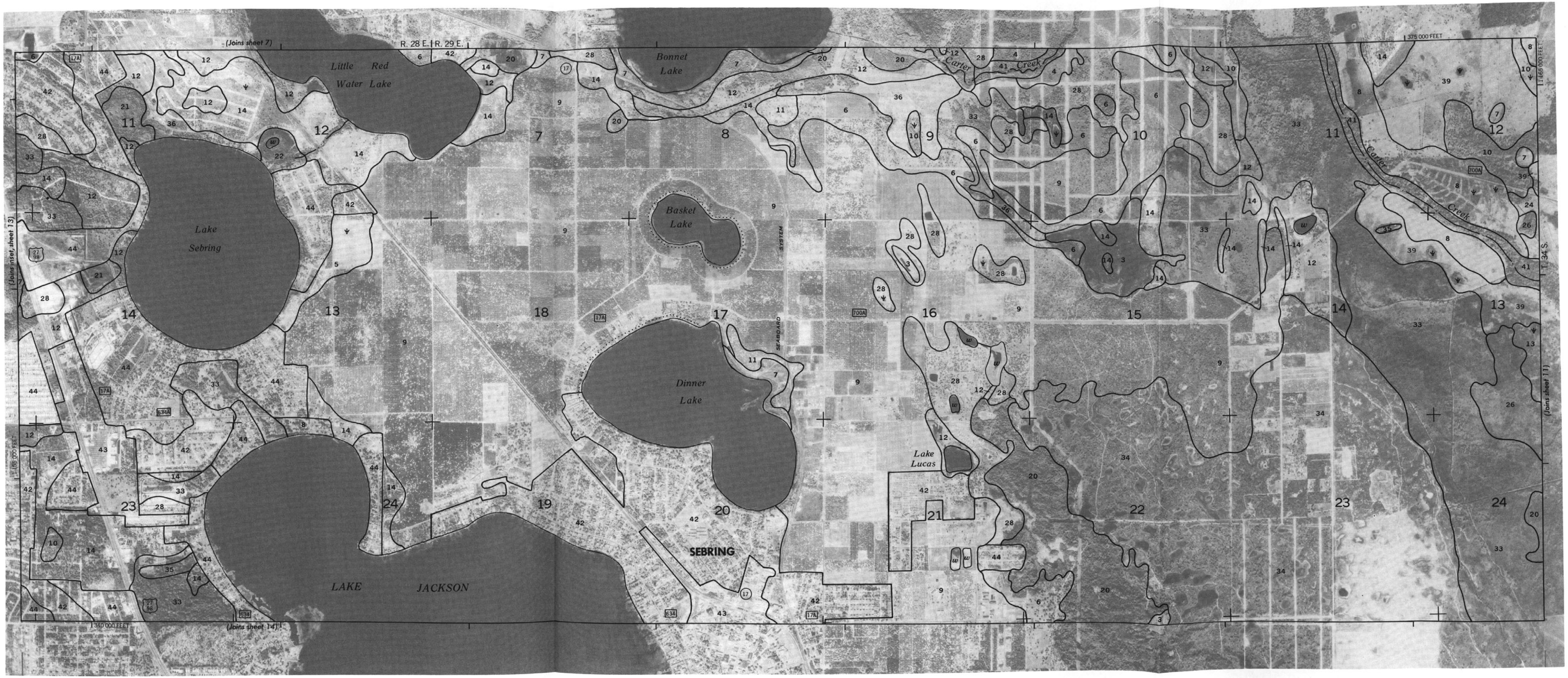

AVON PARK
Lake Lotela
Counterfeit Lake
Lake Glenada
Little Bonnet Lake
Lake Letta
Lake Denton
Little Red Water Lake
Bonnet Lake
Carter Creek
SEABOARD SYSTEM
R. 28 E. | R. 29 E.
T. 34 S. | T. 33 S.
(Joins sheet 3)
(Joins sheet 6)
(Joins sheet 8)
(Joins sheet 10)
N
SCALE 1:24 000
2 MILES
2 KILOMETERS


8
N
R. 29 E.
R. 30 E.
(Joins sheet 4)
R. 30 E.
R. 31 E.
415 000 FEET
380 000 FEET
(Joins sheet 7)
(Joins sheet 9)
T. 34 S.
T. 33 S.
(Joins sheet 11)
ARBUCKLE
CREEK
AVON
PARK
AIR
FORCE
RANGE
Long
Cypress
Slash
water
1
3/4
1/2
1/4
0
1
2 MILES
1
0.5
0
1
2 KILOMETERS
SCALE 1:24 000

9
N



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

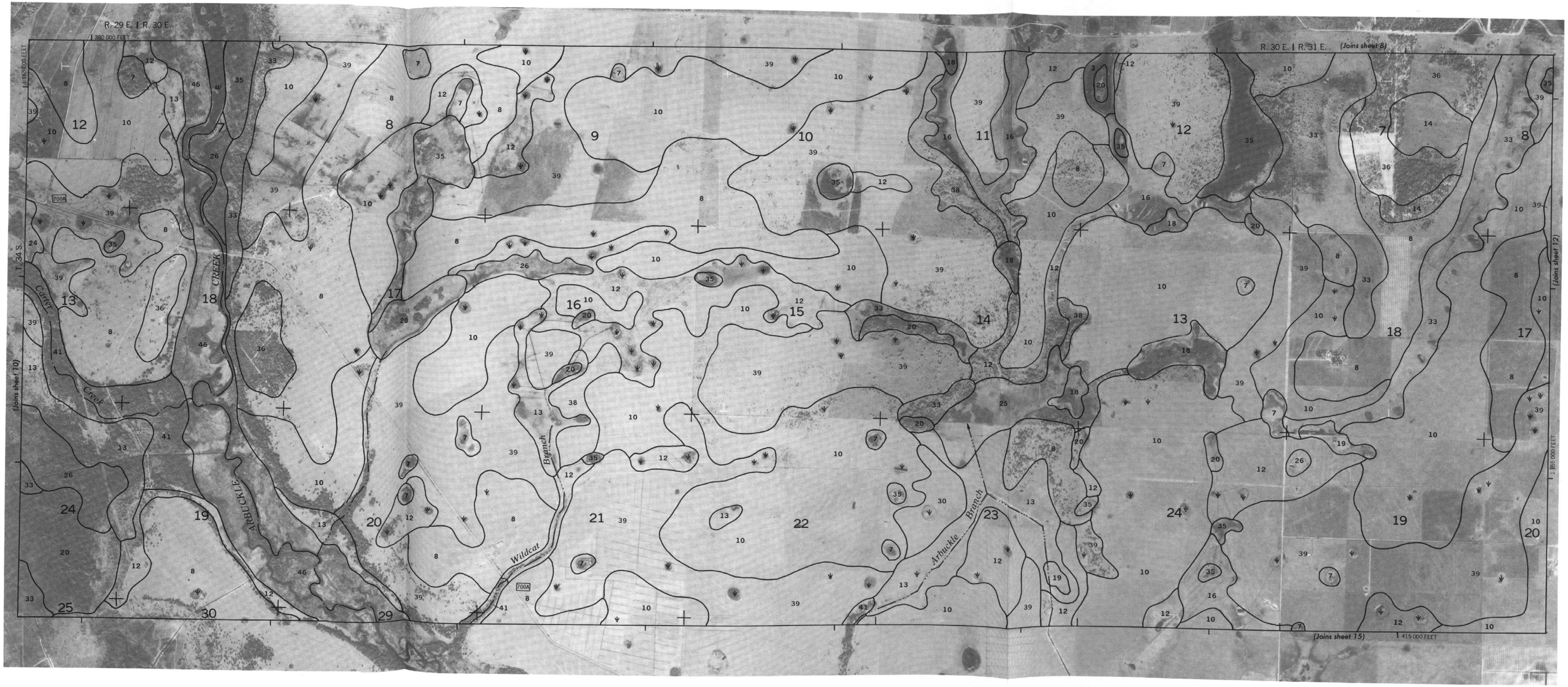


1 3/4 1/2 1/4 0 1 2 MILES

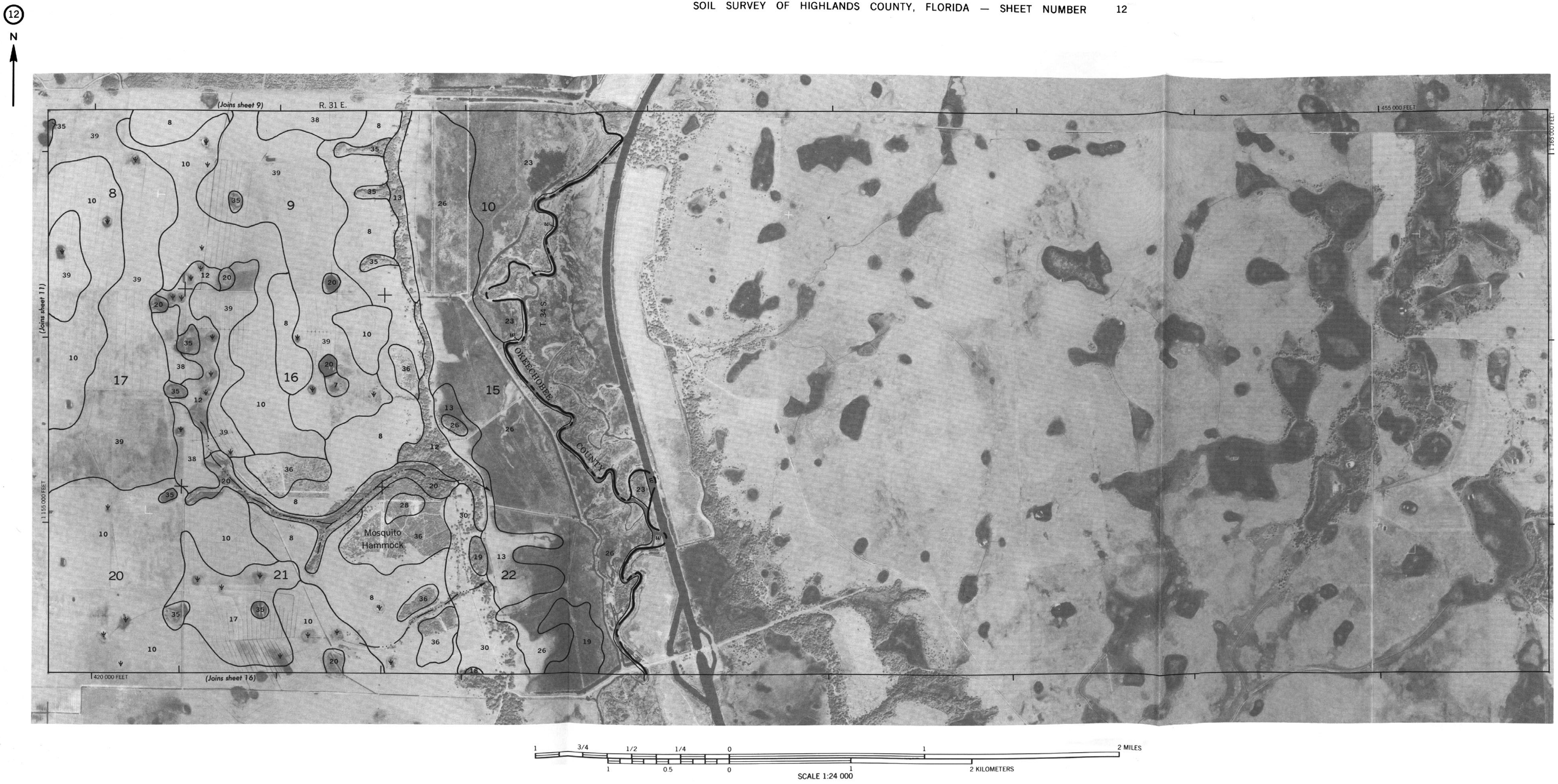
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

11
N

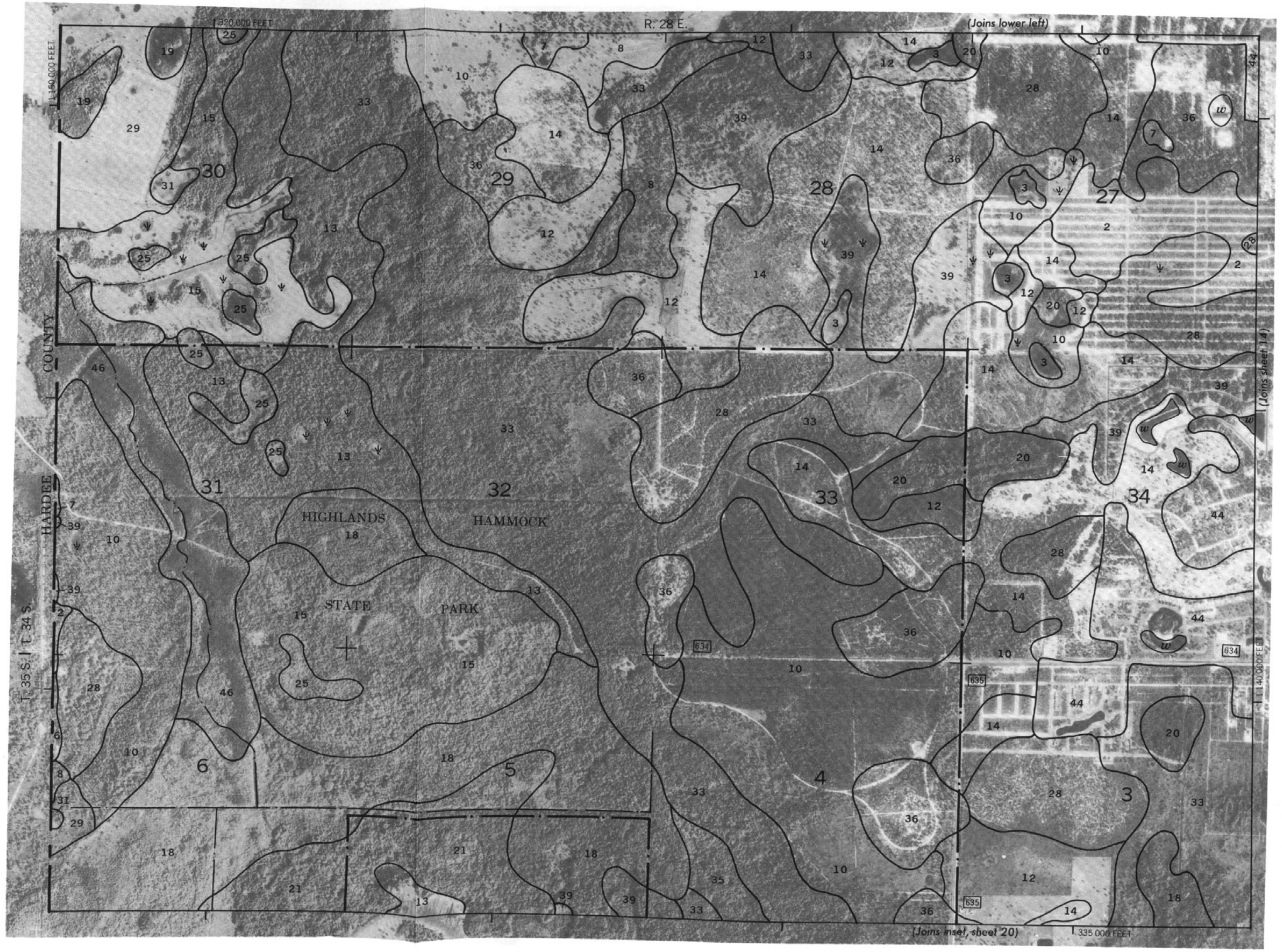


1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000


12
N
(Joins sheet 9)
R. 31 E.
(Joins sheet 11)
(Joins sheet 16)
420 000 FEET
455 000 FEET
1 155 000 FEET
1 165 000 FEET
T. 34 S.
OKEECHOBEE
COUNTY
Mosquito
Hammock
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

13

N



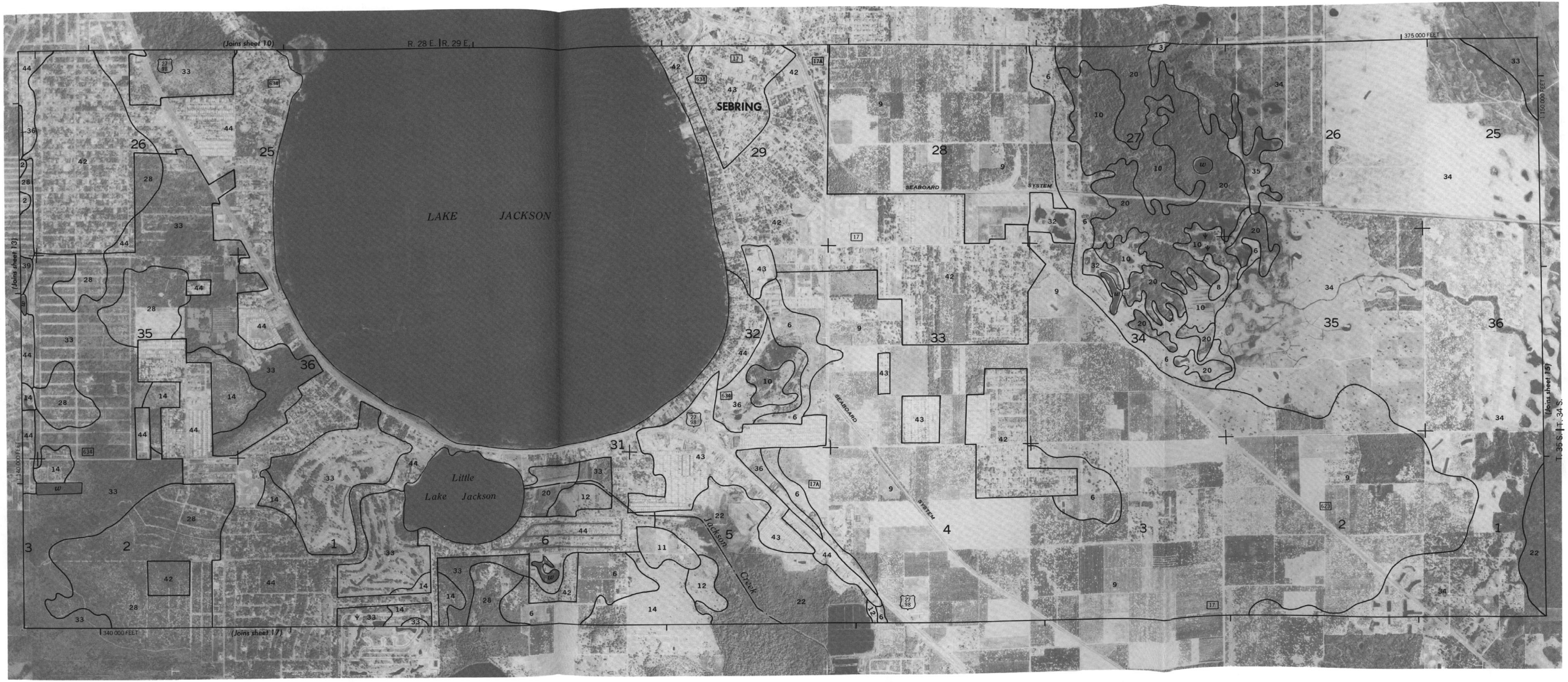
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

14

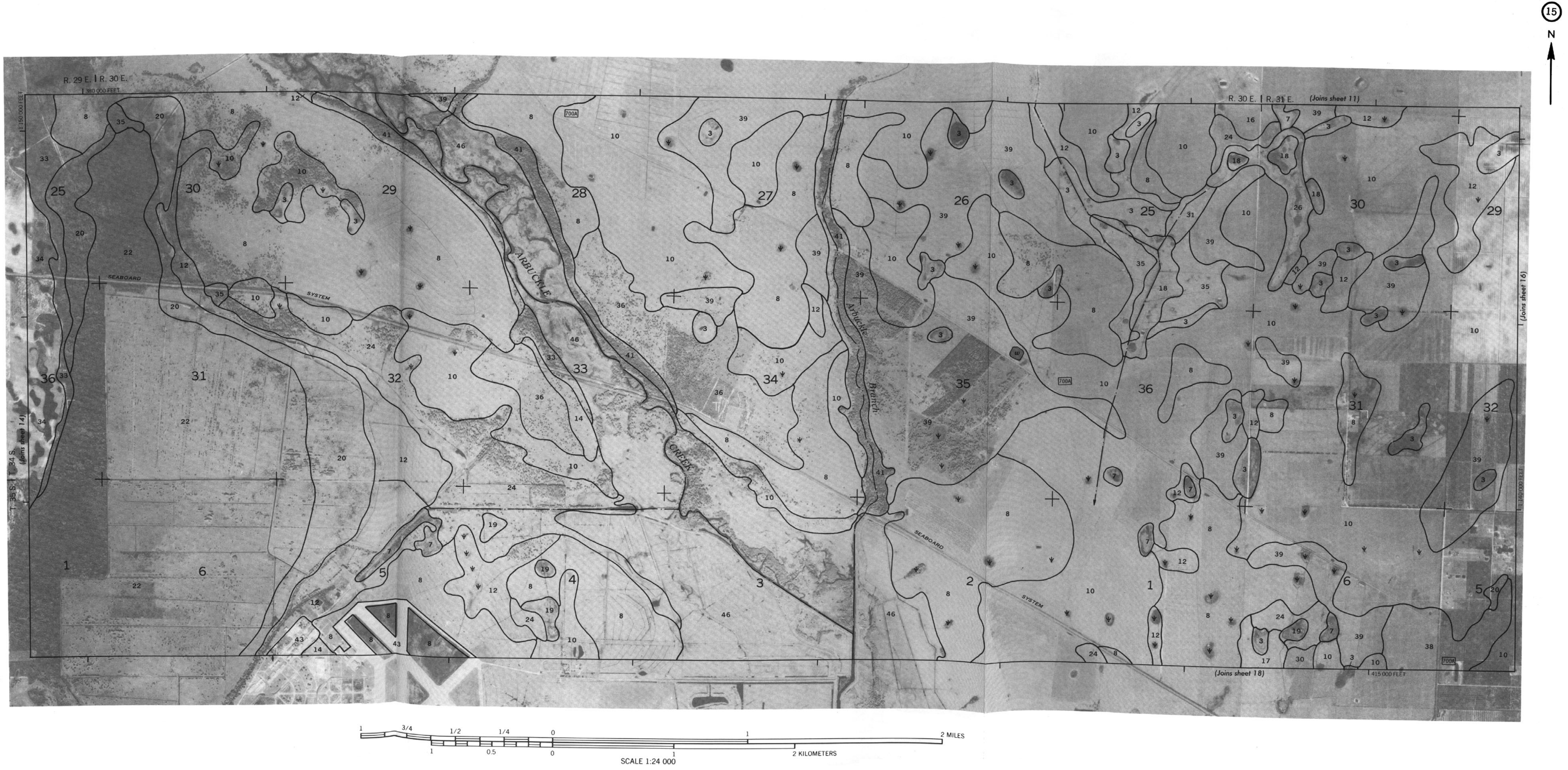
N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


15
N
R. 29 E. | R. 30 E.
380 000 FEET
1 150 000 FEET
(Joins sheet 11)
R. 30 E. | R. 31 E.
(Joins sheet 14)
T. 34 S.
T. 35 S.
(Joins sheet 16)
1 140 000 FEET
(Joins sheet 18)
415 000 FEET
SEABOARD SYSTEM
ARBUCKLE CREEK
Arbuckle Branch
700A
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

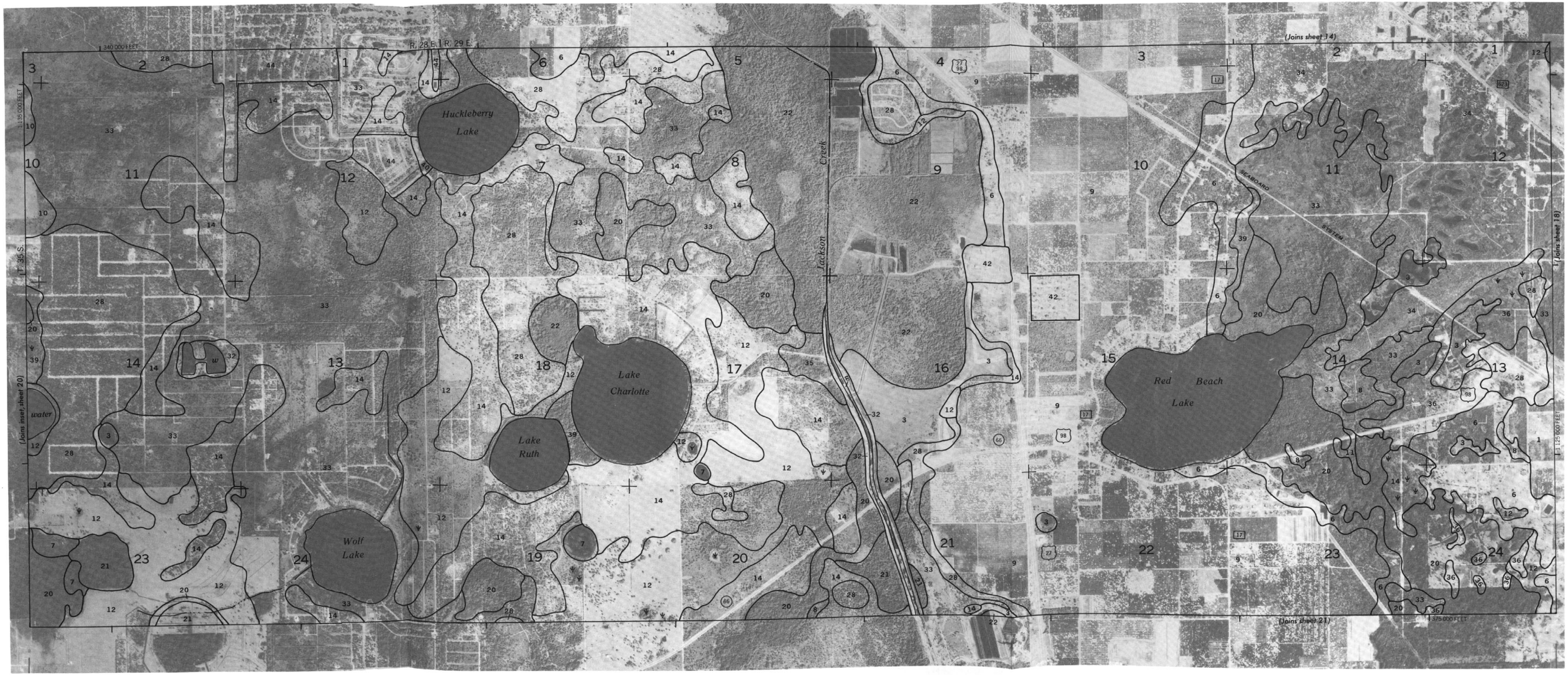
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

17

N



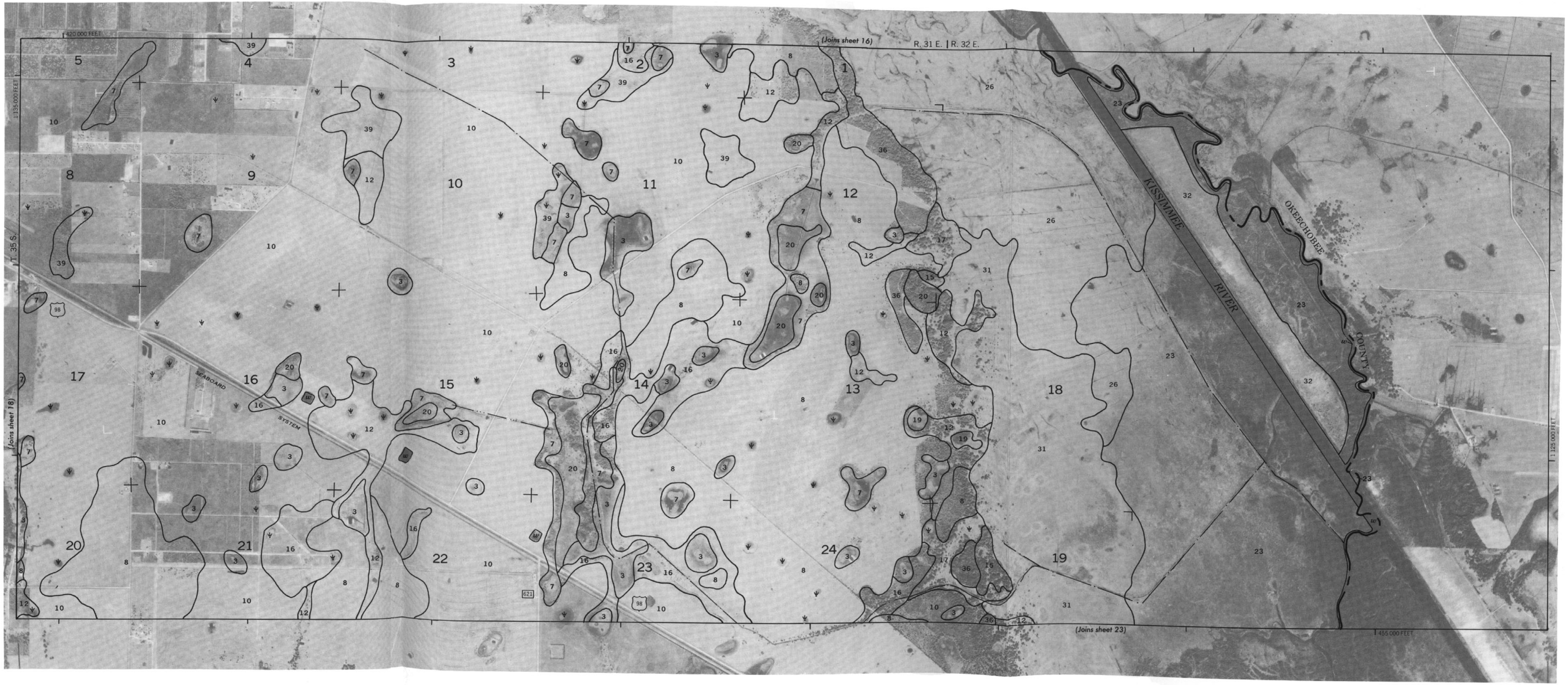
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


N
R. 29 E. | R. 30 E.
(Joins sheet 15)
R. 30 E. | R. 31 E.
415 000 FEET
(Joins sheet 17)
(Joins sheet 19)
(Joins sheet 22)
380 000 FEET
SEABOARD SYSTEM
ARBUCKLE CREEK
LAKE ISTOKPOGA
Lorida
T. 35 S.
1 MILES
3/4
1/2
1/4
0
1
2 MILES
1
0.5
0
1
2 KILOMETERS
SCALE 1:24 000

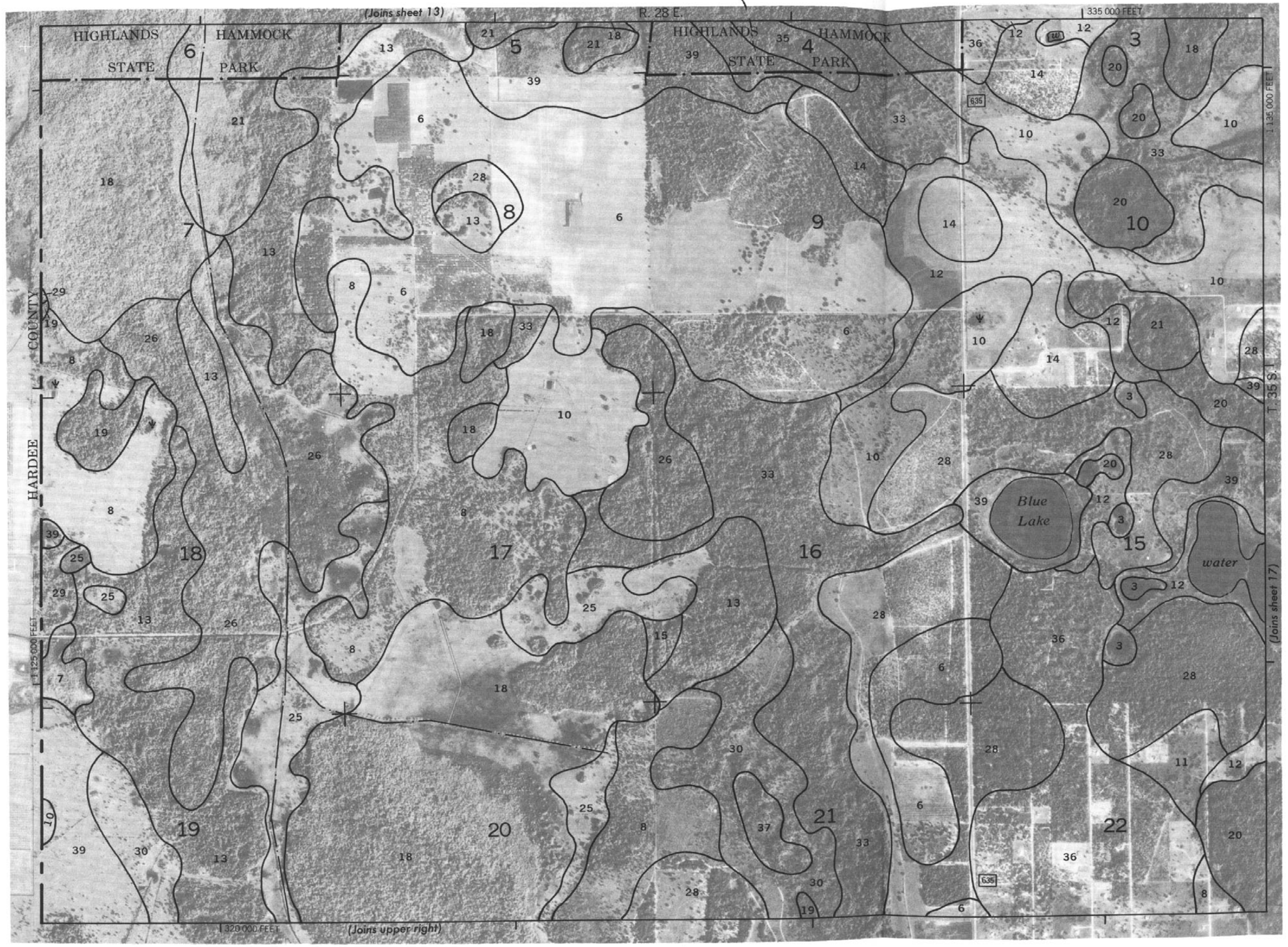
19
N

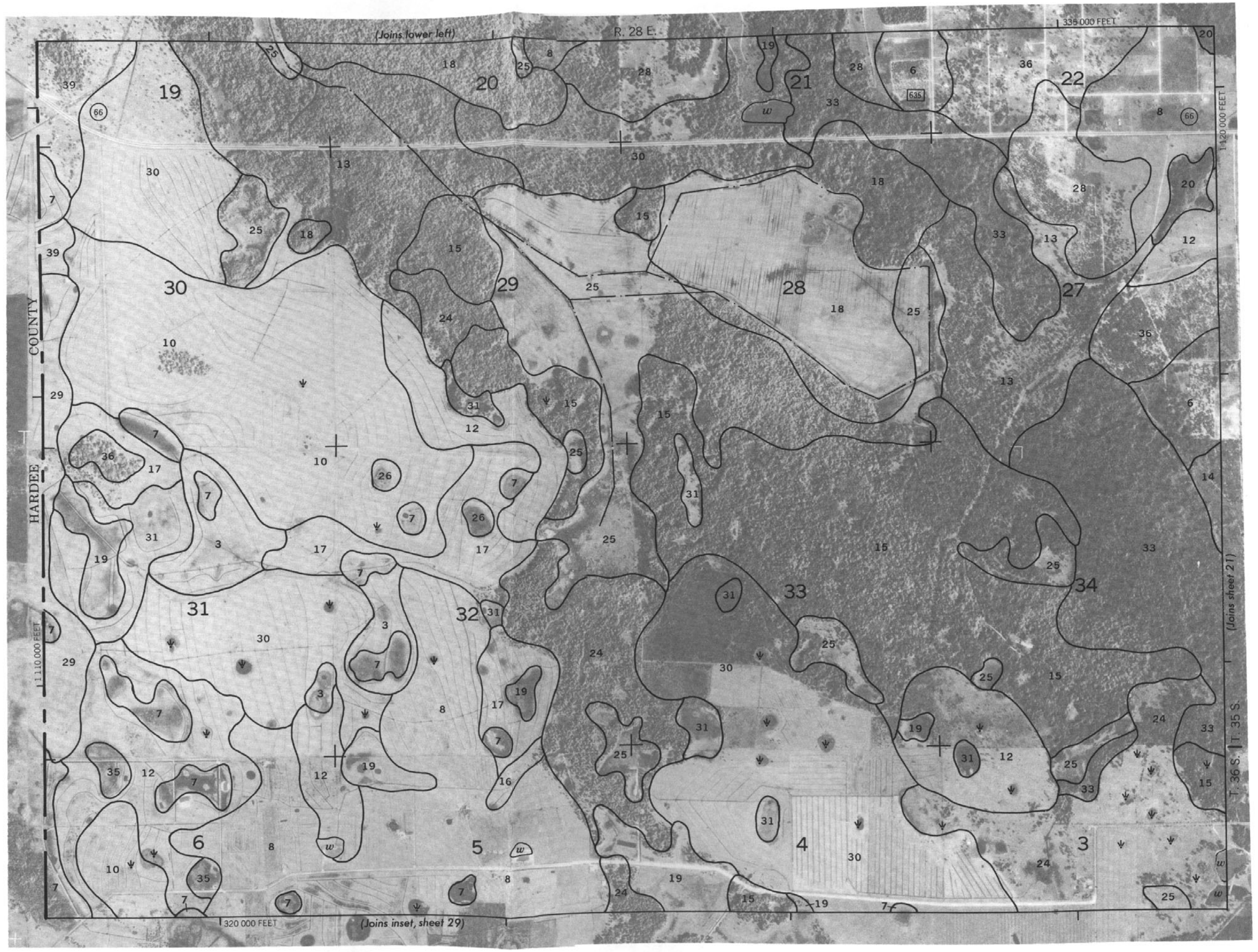


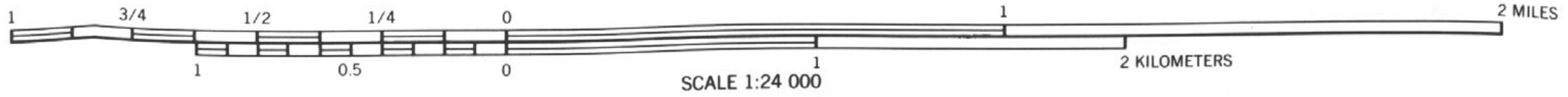
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

20

N

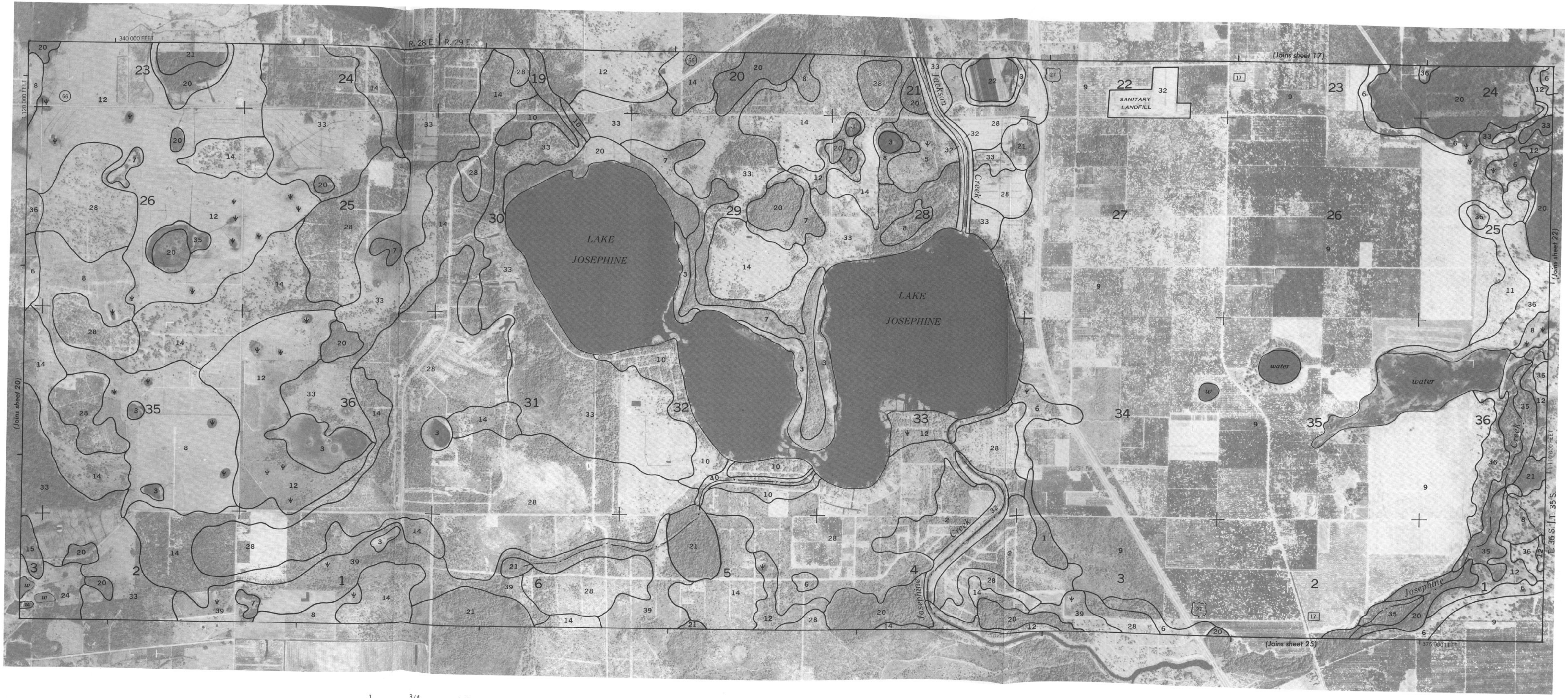

(Joins sheet 13)
R. 28 E.
HIGHLANDS STATE PARK
HIGHLANDS STATE PARK
HAMMOCK
HAMMOCK
335 000 FEET
1 135 000 FEET
HARDEE COUNTY
Blue Lake
water
(Joins sheet 17)
T. 35 S.
1 125 000 FEET
320 000 FEET
(Joins upper right)


(Joins lower left)
R. 28 E.
335 000 FEET
1 120 000 FEET
HARDEE COUNTY
(Joins sheet 21)
T. 35 S.
1 110 000 FEET
320 000 FEET
(Joins inset, sheet 29)


1
3/4
1/2
1/4
0
1
2 MILES
1
0.5
0
1
2 KILOMETERS
SCALE 1:24 000

21

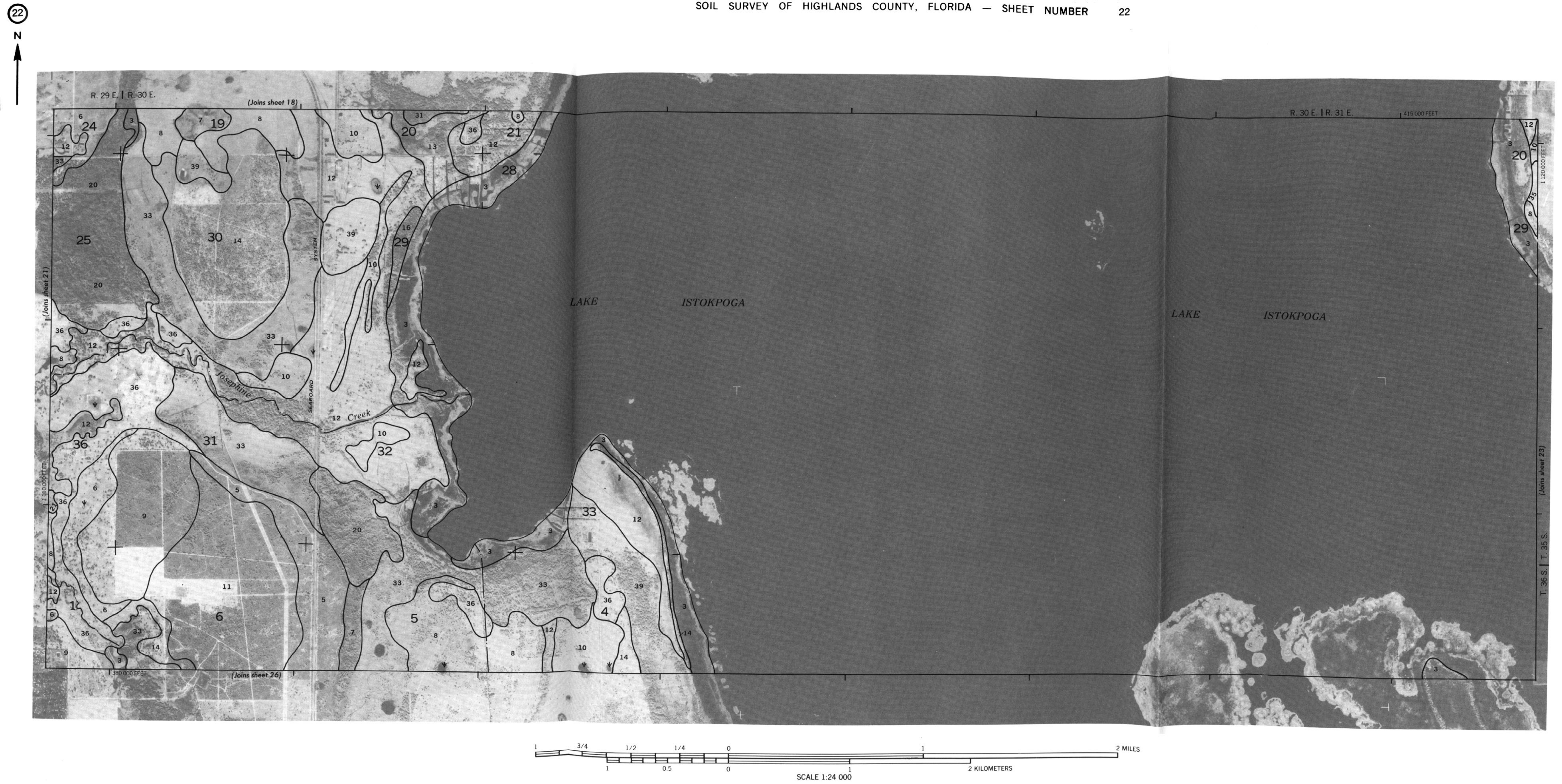
N

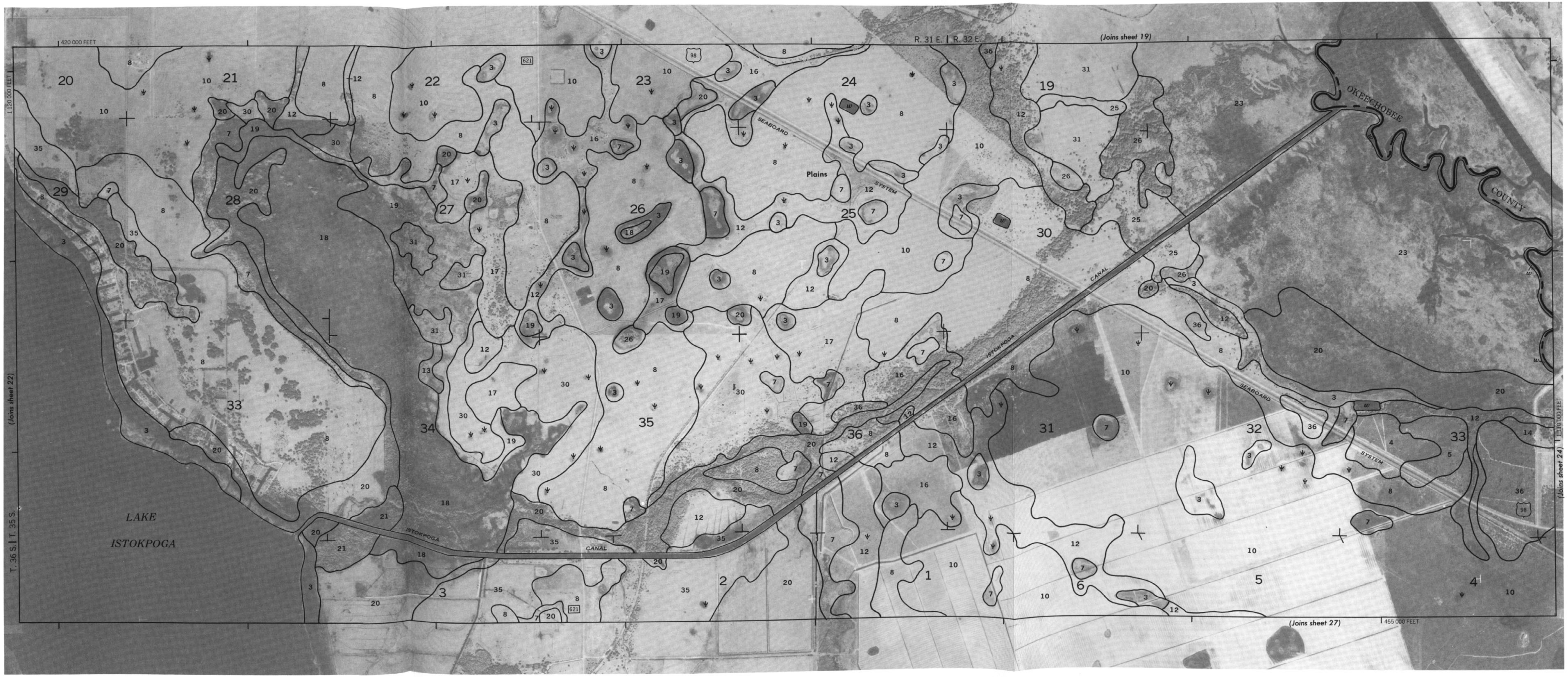


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


22
N
R. 29 E. | R. 30 E.
(Joins sheet 18)
R. 30 E. | R. 31 E.
415 000 FEET
1 120 000 FEET
(Joins sheet 21)
(Joins sheet 23)
(Joins sheet 26)
380 000 FEET
T. 35 S. | T. 36 S.
LAKE ISTOKPOGA
LAKE ISTOKPOGA
Josephine Creek
SEABOARD SYSTEM
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000



SCALE 1:24 000

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

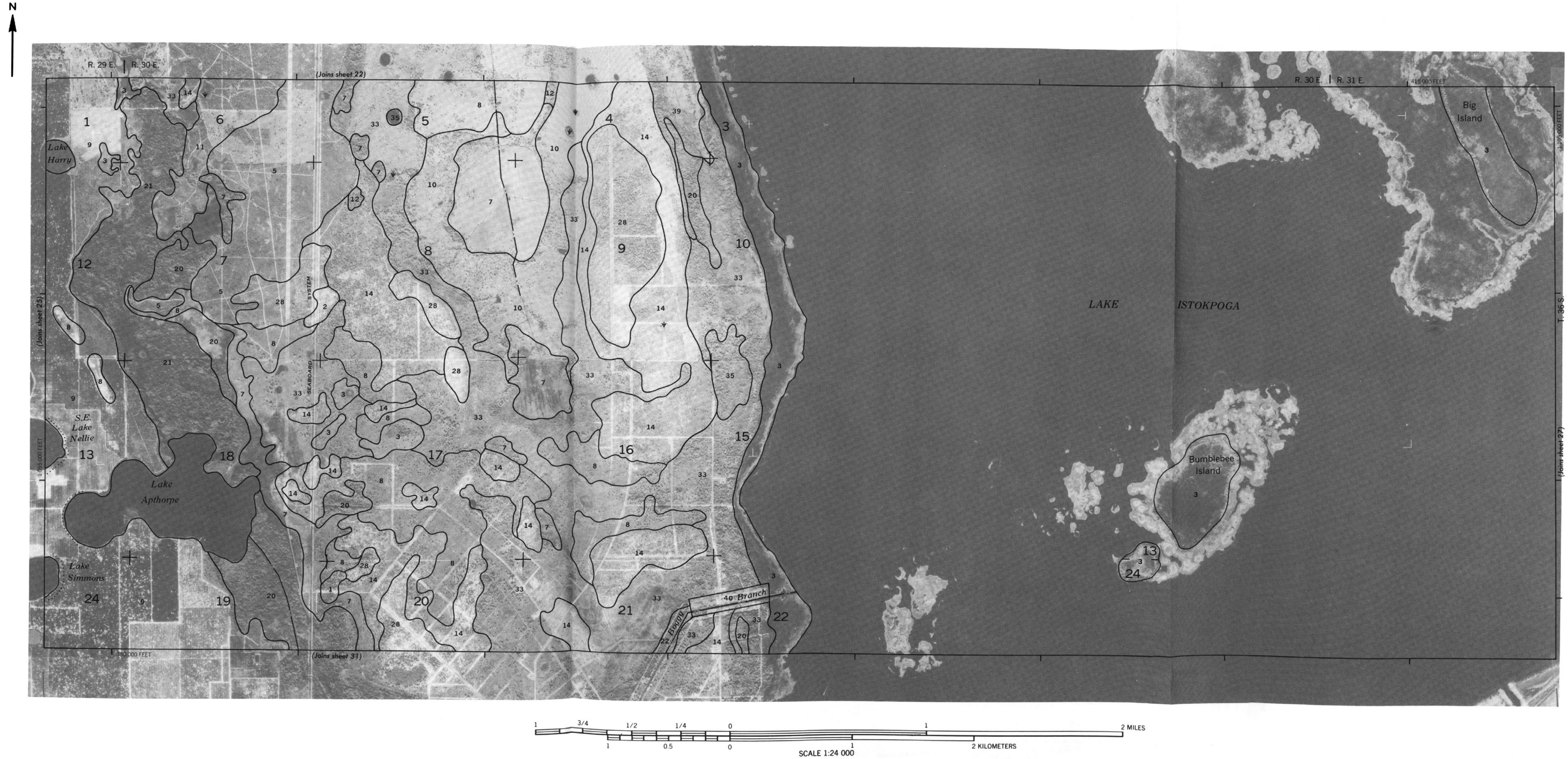
25

N

1 3/4 1/2 1/4 0 1 2 MILES

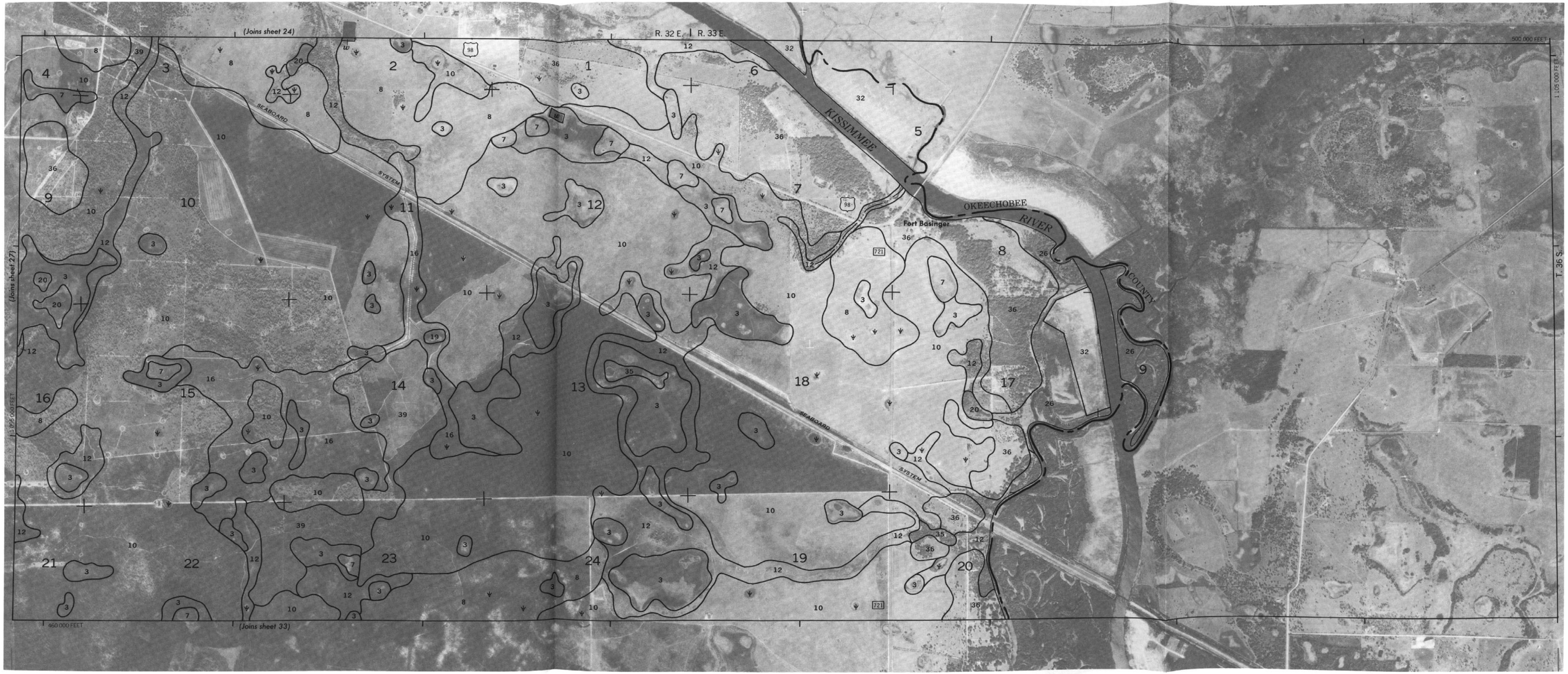
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


N
R. 29 E.
R. 30 E.
(Joins sheet 22)
R. 30 E.
R. 31 E.
415 000 FEET
1 105 000 FEET
(Joins sheet 25)
(Joins sheet 27)
(Joins sheet 31)
380 000 FEET
1 085 000 FEET
T. 36 S.
Lake Harry
S.E. Lake Nellie
Lake Apthorpe
Lake Simmons
SEABOARD
SYSTEM
LAKE
ISTOKPOGA
Big Island
Bumblebee Island
Boggy
Branch
1
3/4
1/2
1/4
0
1
2 MILES
1
0.5
0
1
2 KILOMETERS
SCALE 1:24 000


27
N
LAKE
ISTOKPOGA
420 000 FEET
1 105 000 FEET
T. 36 S.
(Joins sheet 26)
R. 31 E.
R. 32 E.
(Joins sheet 23)
(Joins sheet 28)
1 095 000 FEET
(Joins sheet 32)
455 000 FEET
621
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

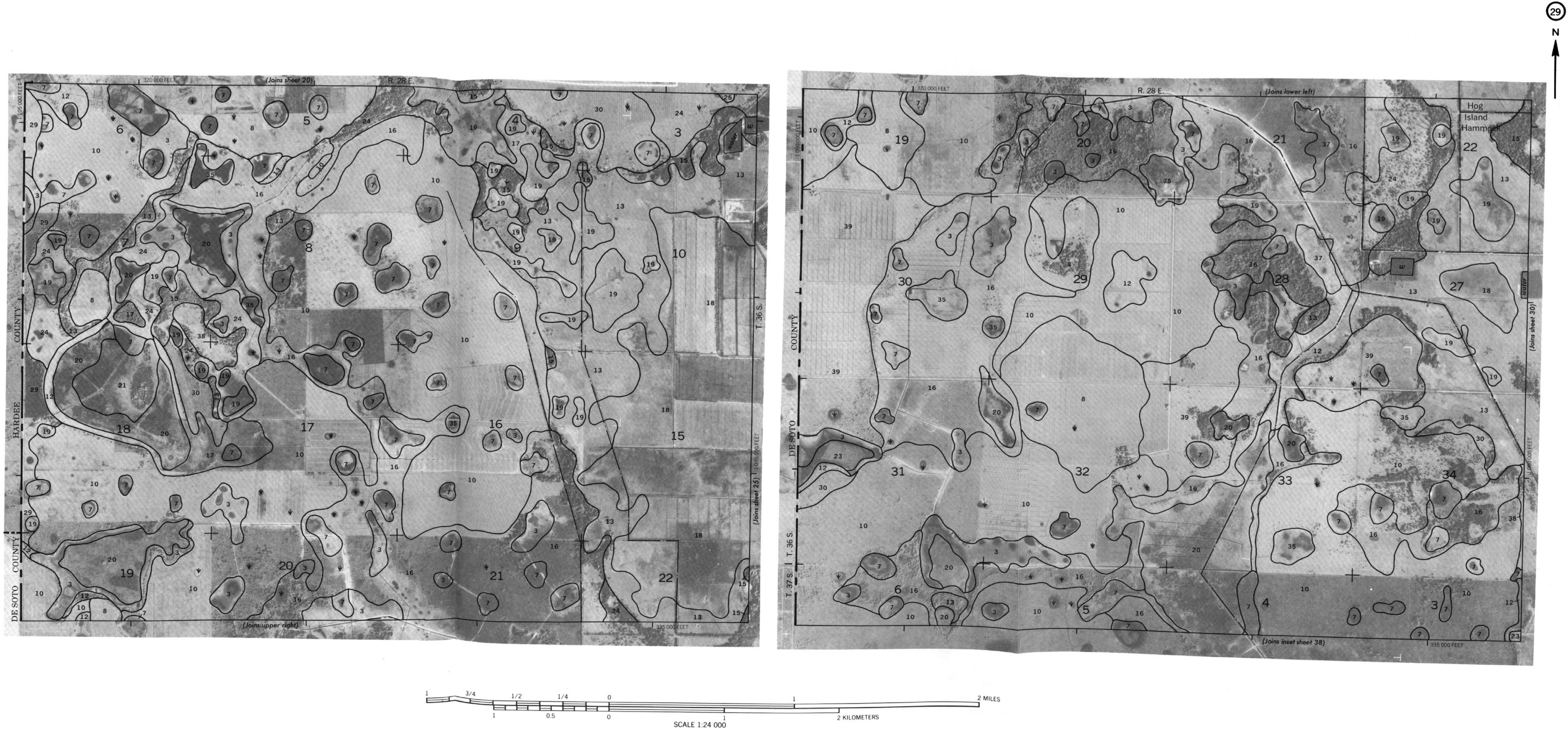
N



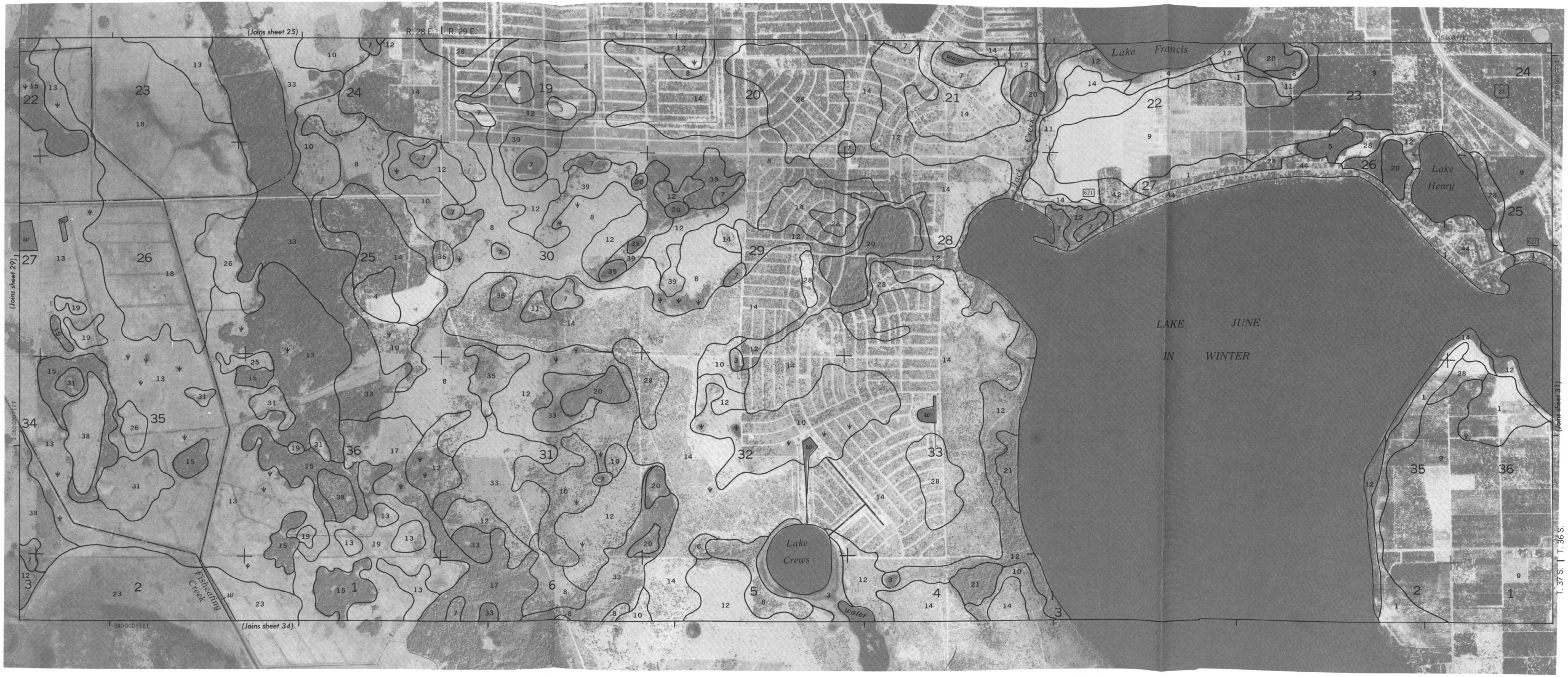
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


29
N
(Joins sheet 20)
R. 28 E.
320 000 FEET
(Joins upper right)
335 000 FEET
(Joins sheet 25)
T. 36 S.
HARDEE COUNTY
DE SOTO COUNTY
(Joins lower left)
Hog Island Hammock
(Joins sheet 30)
(Joins inset sheet 38)
T. 37 S.
water
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N



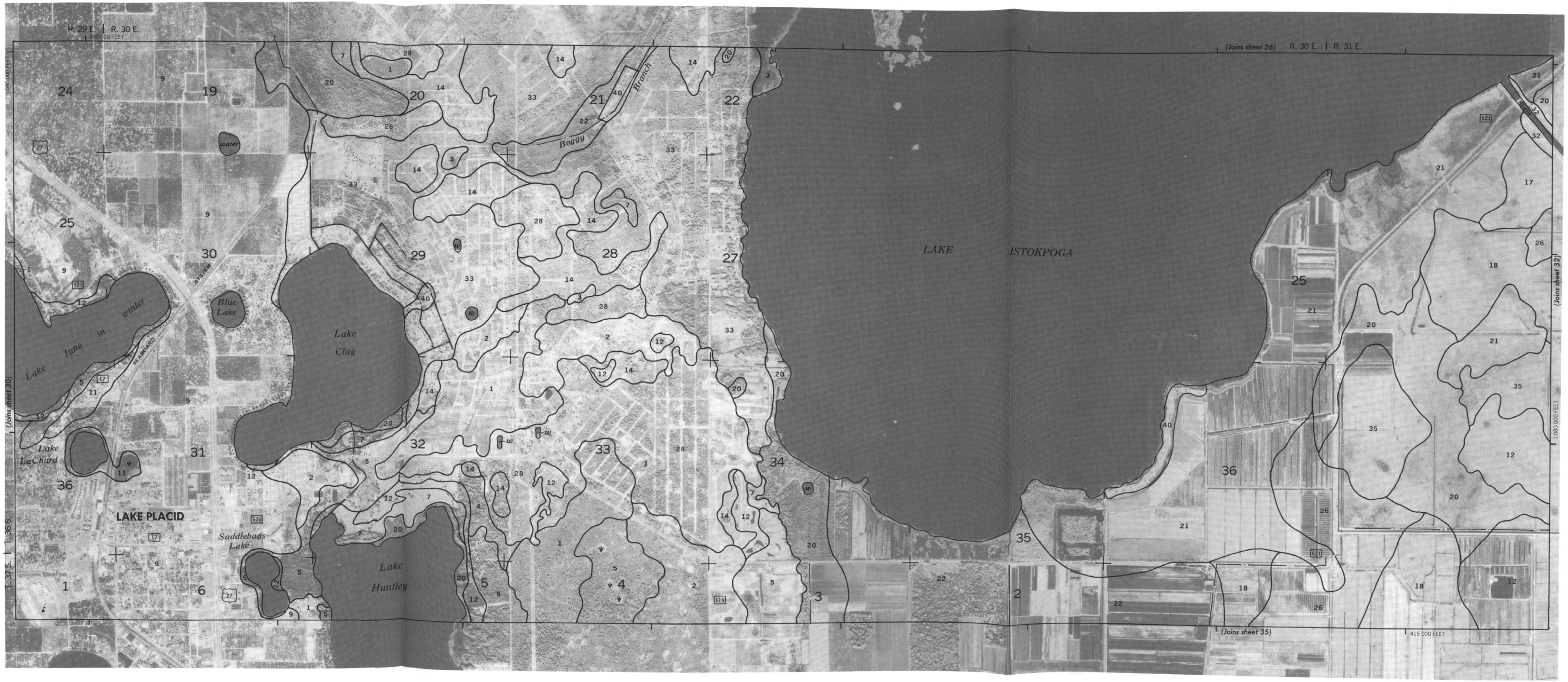
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

31

N



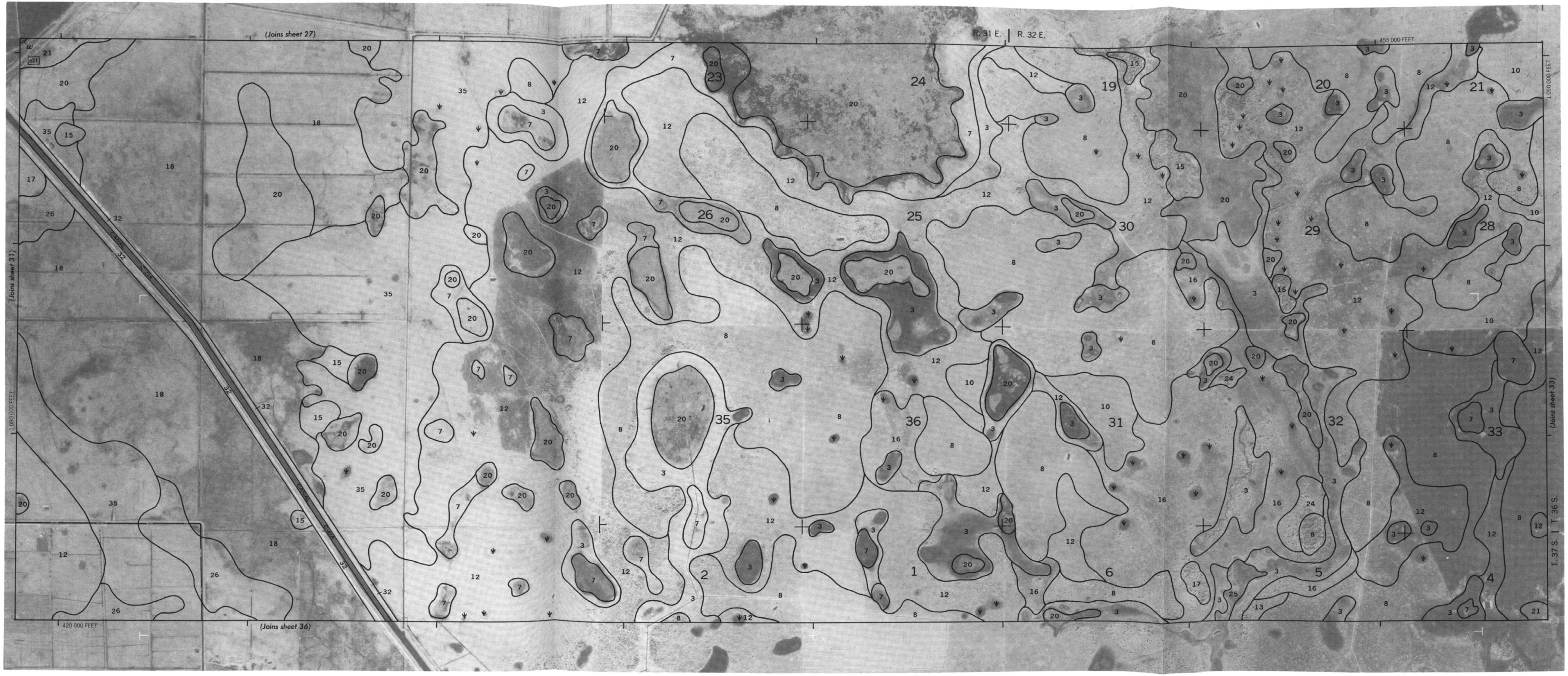
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

SOIL SURVEY OF HIGHLANDS COUNTY, FLORIDA — SHEET NUMBER 32

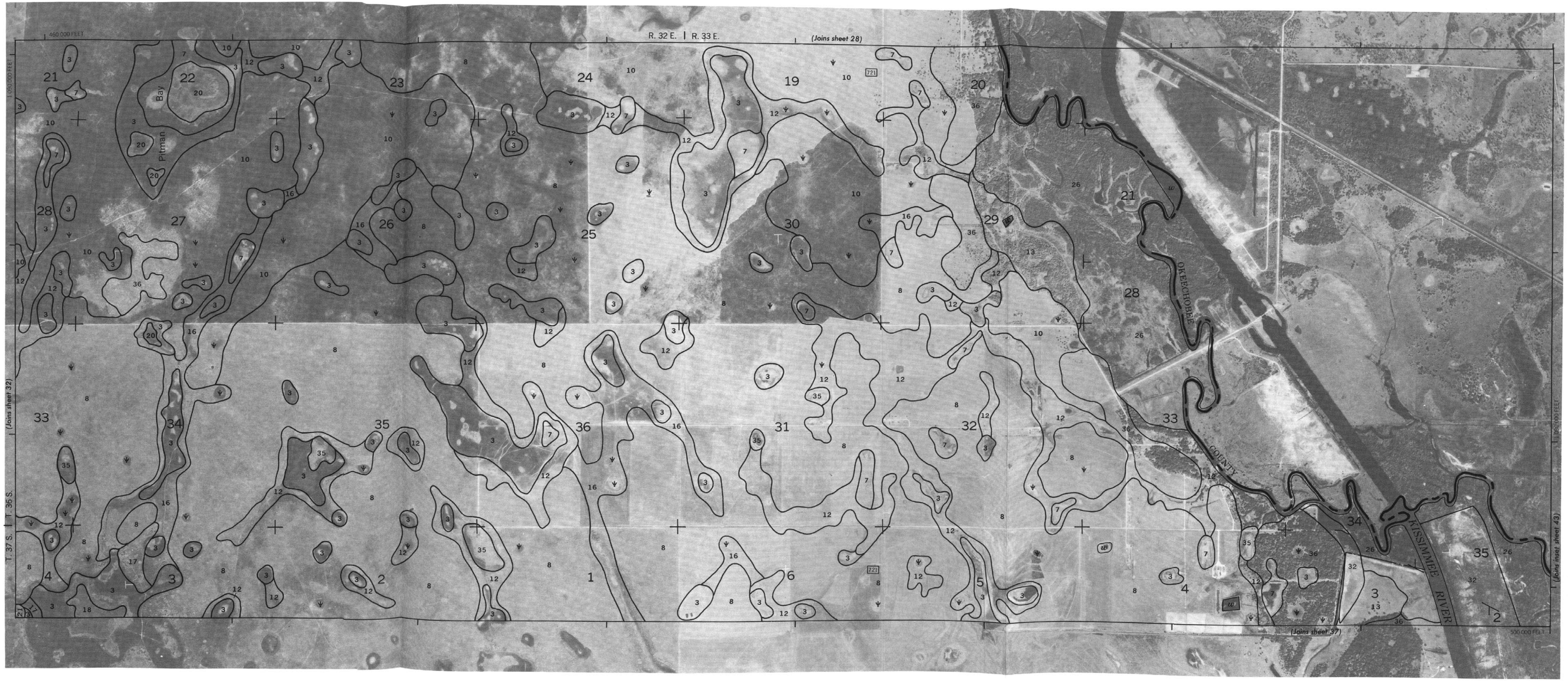


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

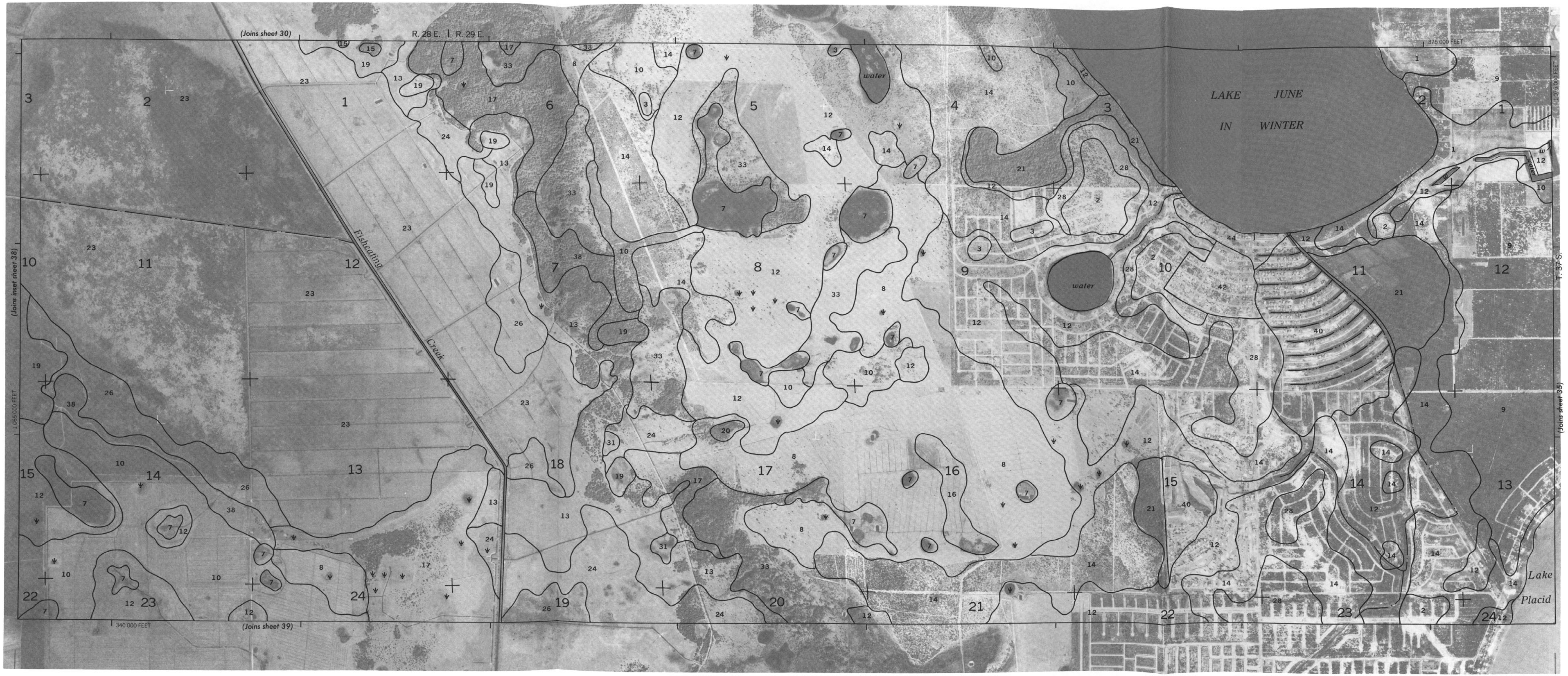
SCALE 1:24 000

33
N



1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N



1 3/4 1/2 1/4 0 1 2 MILES

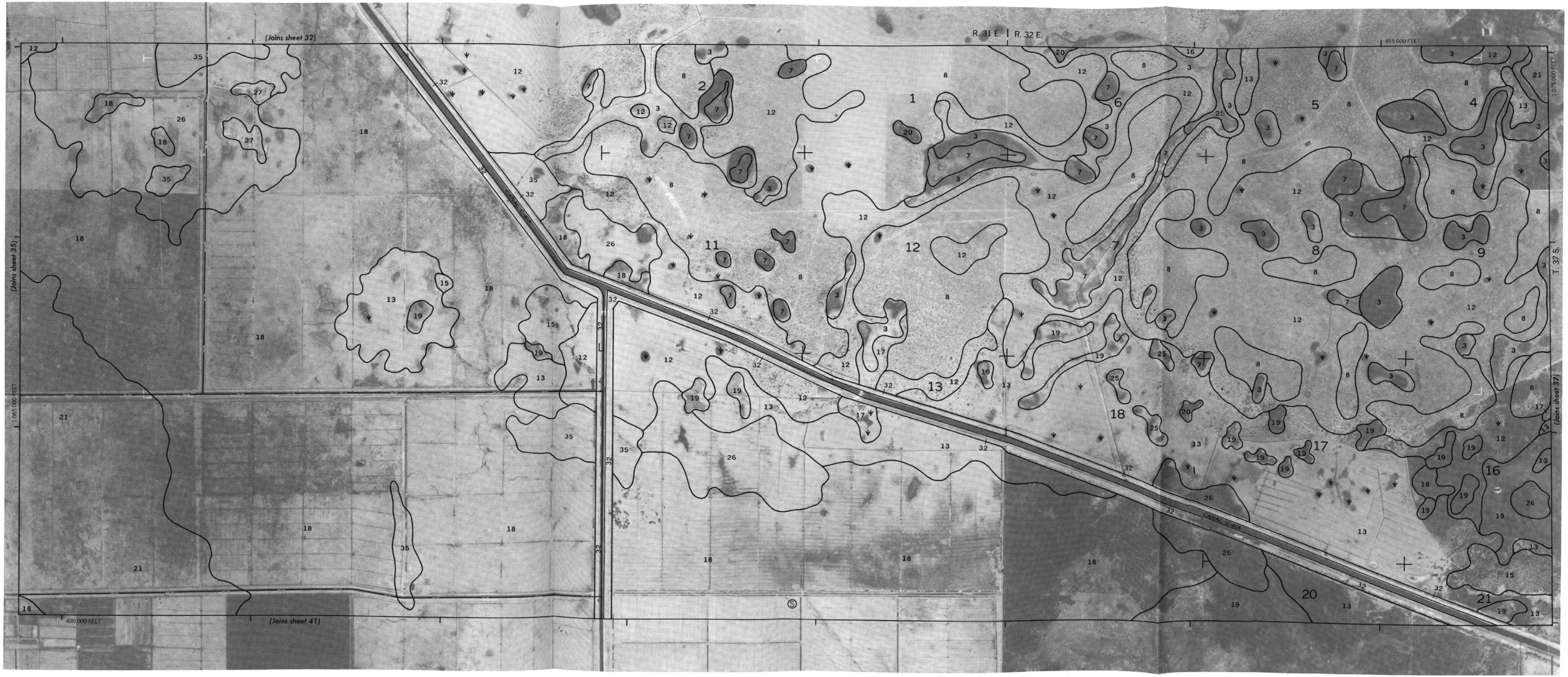
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000


N
LAKE PLACID
R. 29 E. | R. 30 E.
R. 30 E. | R. 31 E.
T. 37 S.
(Joins sheet 31)
(Joins sheet 36)
(Joins sheet 40)
(Joins sheet 34)
Lake Sirena
Lake Pearl
Lake McCoy
Lake Huntley
Mirror Lake
Lost Lake
Lake Placid
Grassy Lake
water
SCALE 1:24 000
2 MILES
2 KILOMETERS

N

SOIL SURVEY OF HIGHLANDS COUNTY, FLORIDA — SHEET NUMBER 36

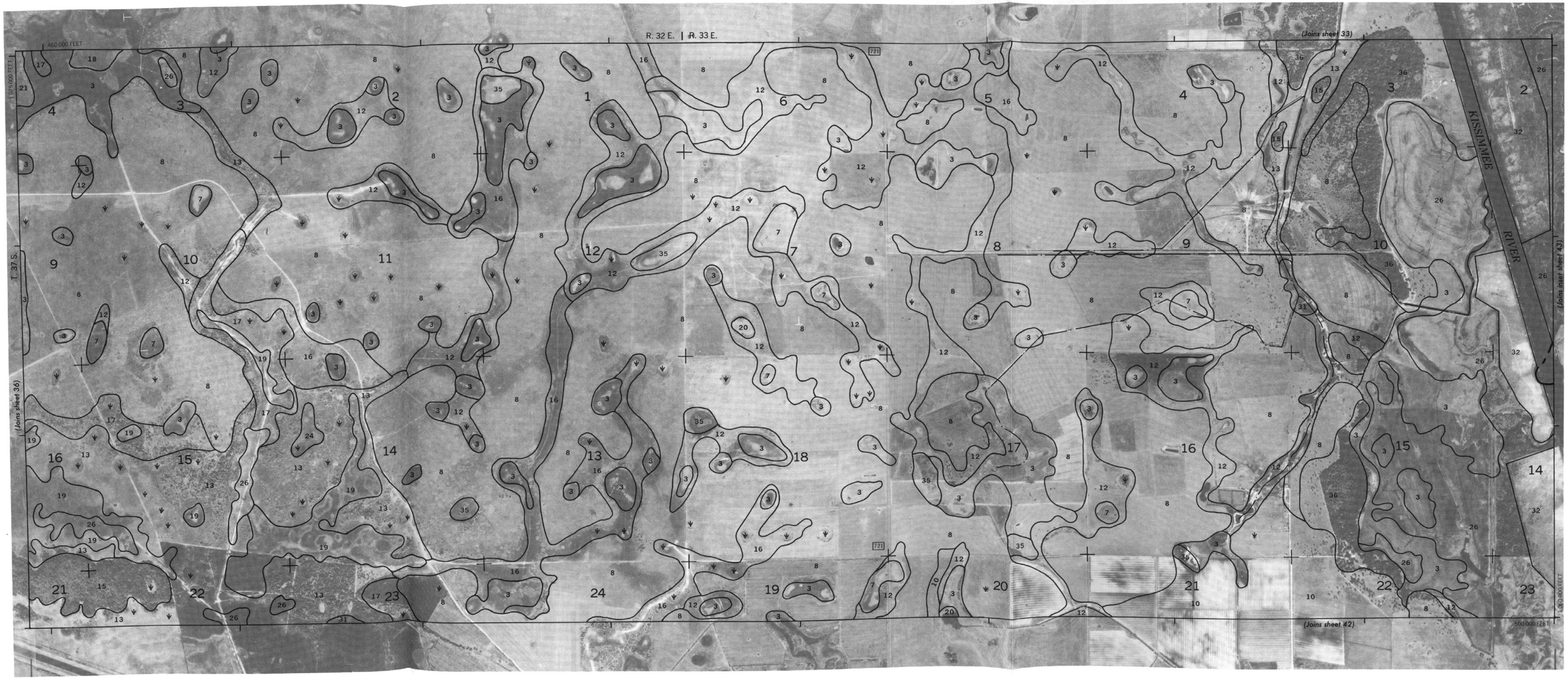


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

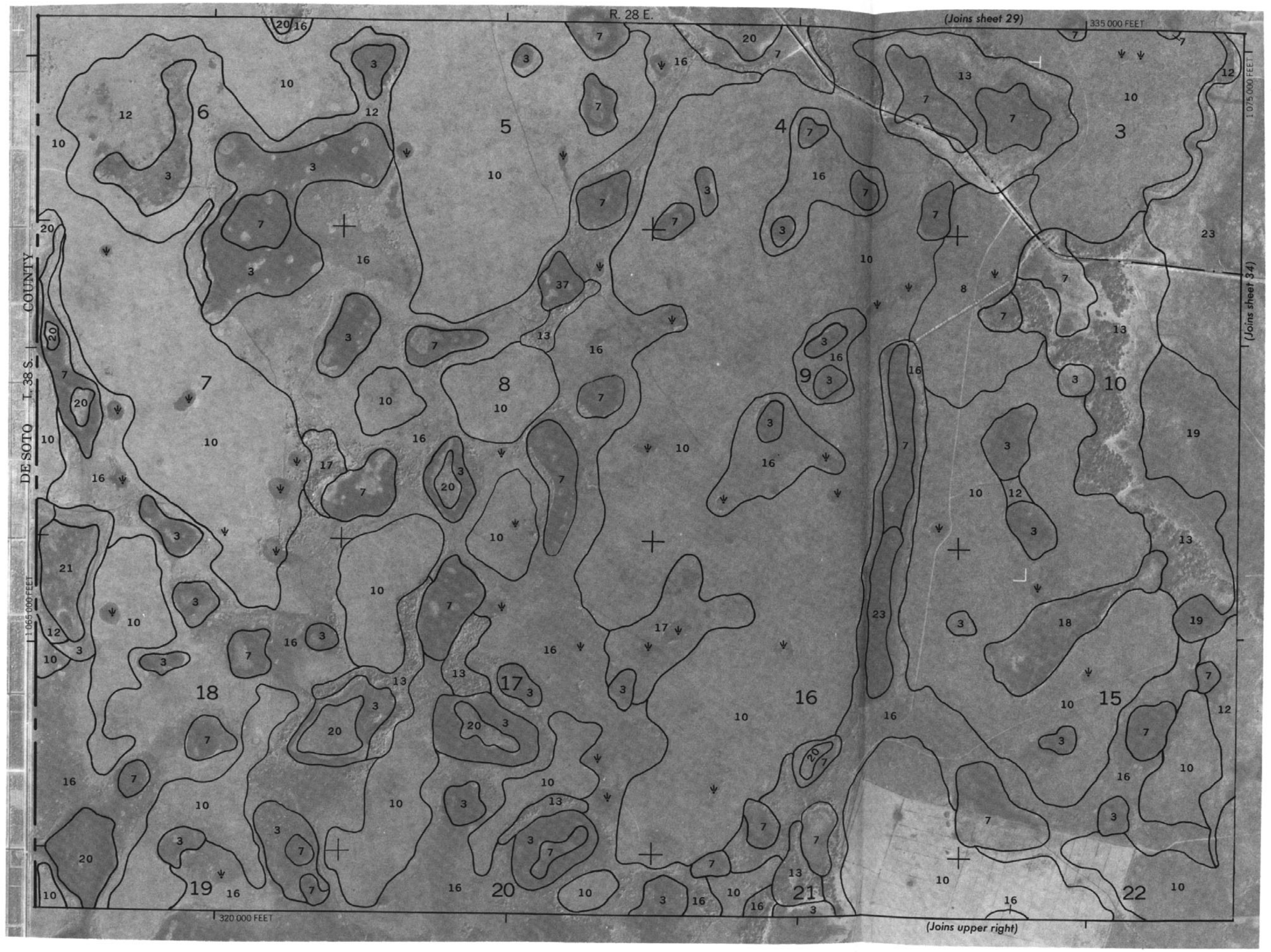
37
N

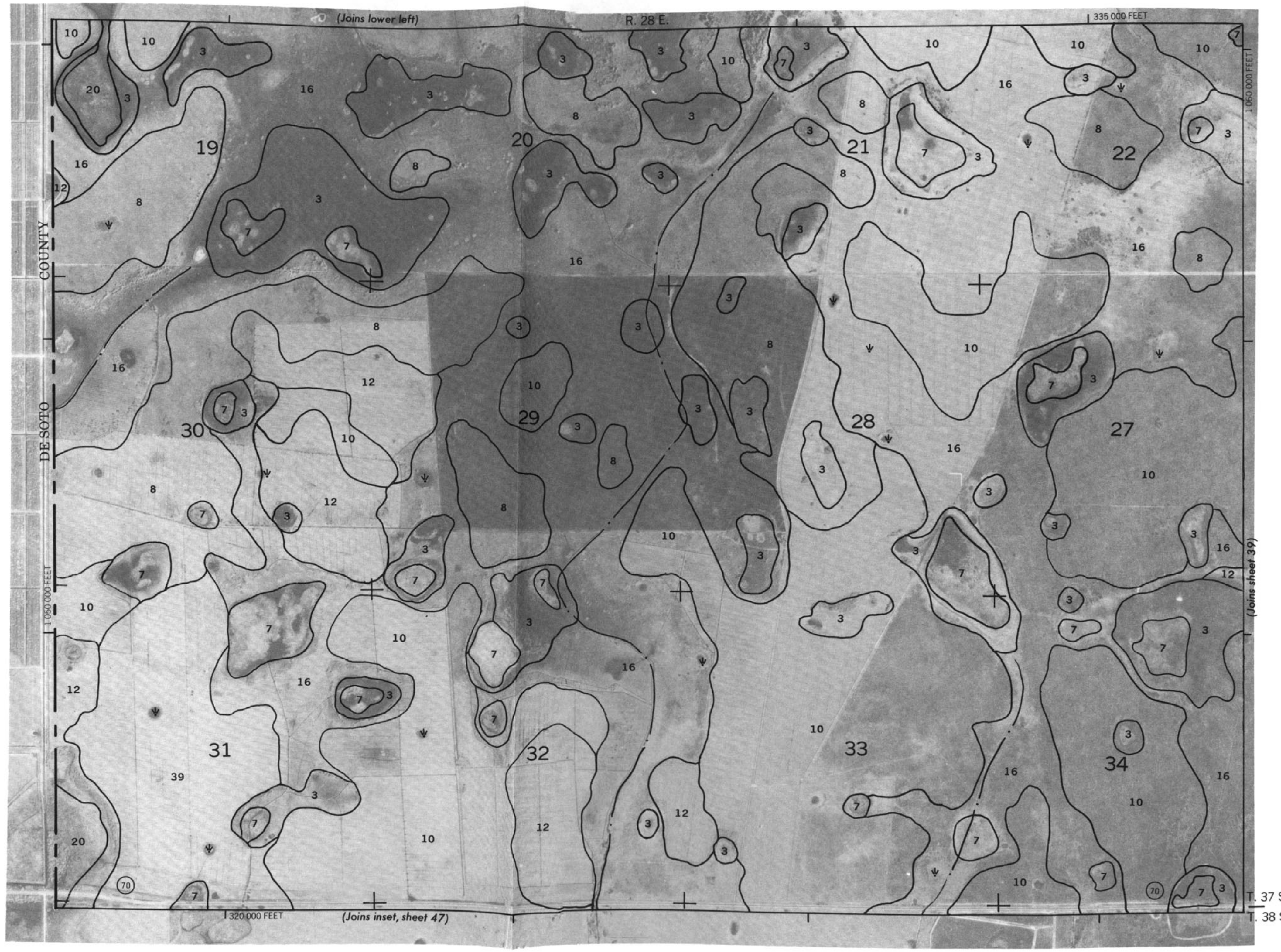


1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

SOIL SURVEY OF HIGHLANDS COUNTY, FLORIDA — SHEET NUMBER 38





1 3/4 1/2 1/4 0 1 2 MILES

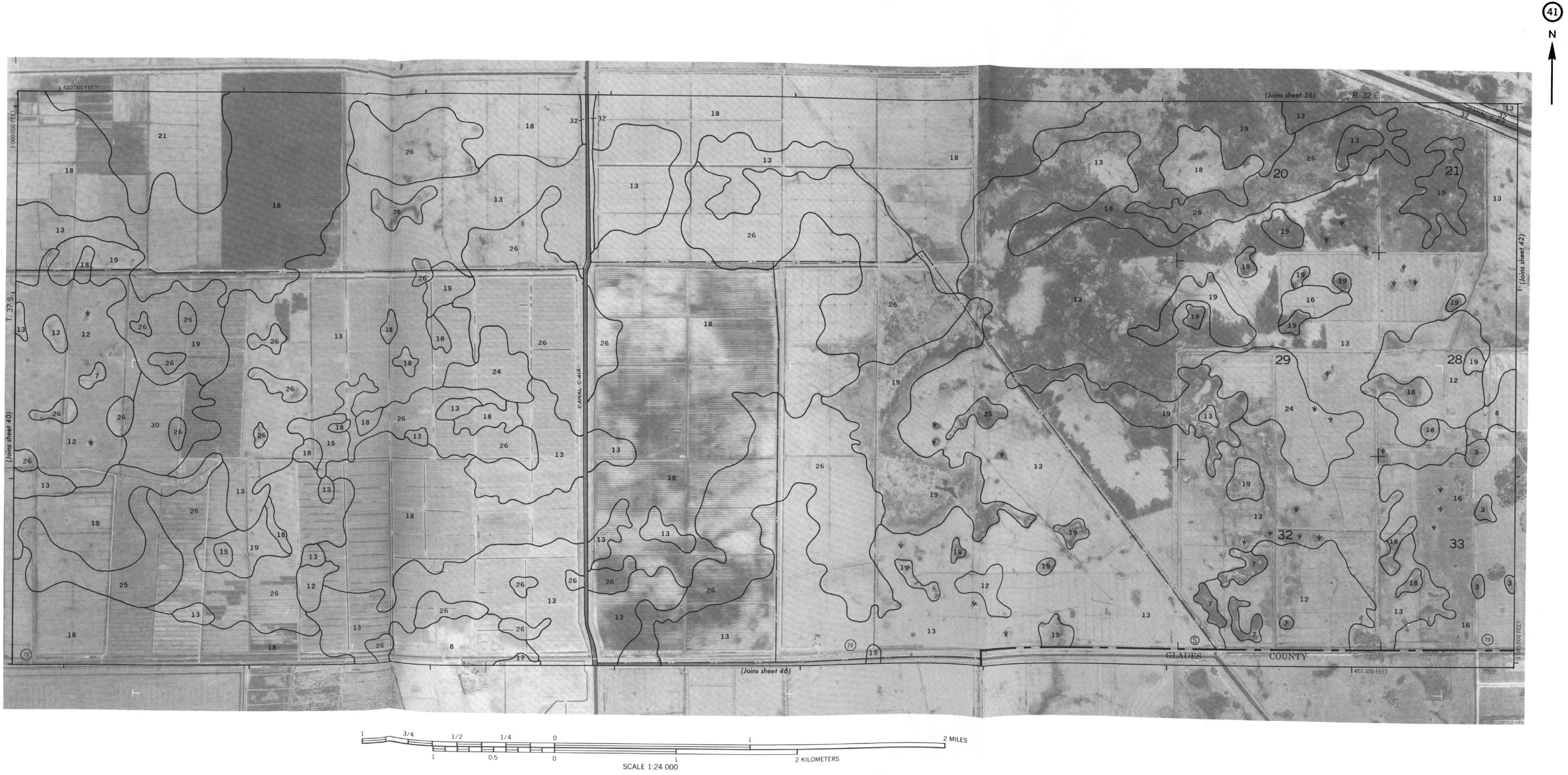
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

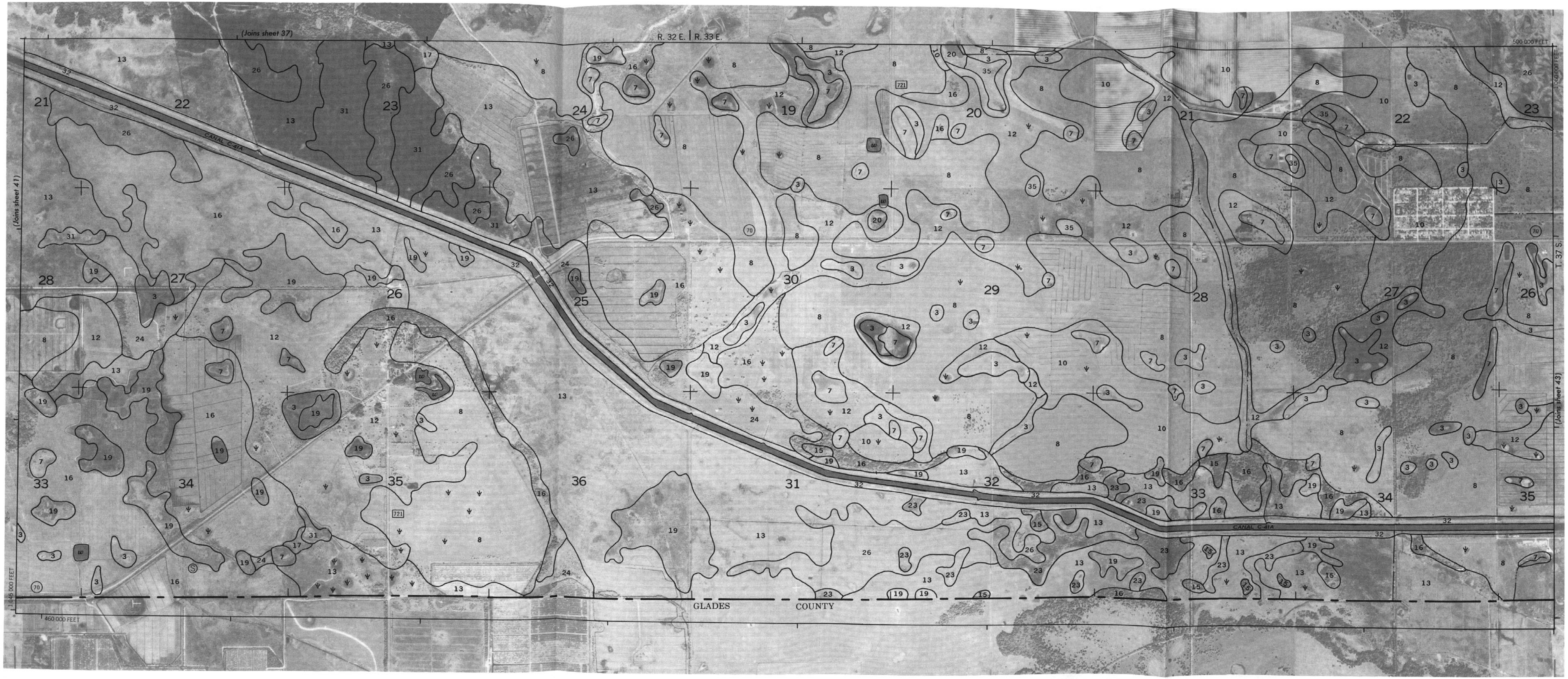

39
N
R. 28 E.
R. 29 E.
340 000 FEET
1 060 000 FEET
(Joins sheet 34)
(Joins sheet 38)
(Joins sheet 40)
(Joins sheet 44)
375 000 FEET
Fisheating Creek
Lake Placid
T. 37 S.
T. 38 S.
2 MILES
2 KILOMETERS
SCALE 1:24 000

40
N

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000


41
N
(Joins sheet 36)
R. 32 E.
420 000 FEET
1 060 000 FEET
T. 37 S.
(Joins sheet 40)
(Joins sheet 42)
(Joins sheet 46)
CANAL C-41A
CANAL C-41A
GLADES COUNTY
455 000 FEET
1 045 000 FEET
70
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

43
N

1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N

SOIL SURVEY OF HIGHLANDS COUNTY, FLORIDA — SHEET NUMBER 44

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

45

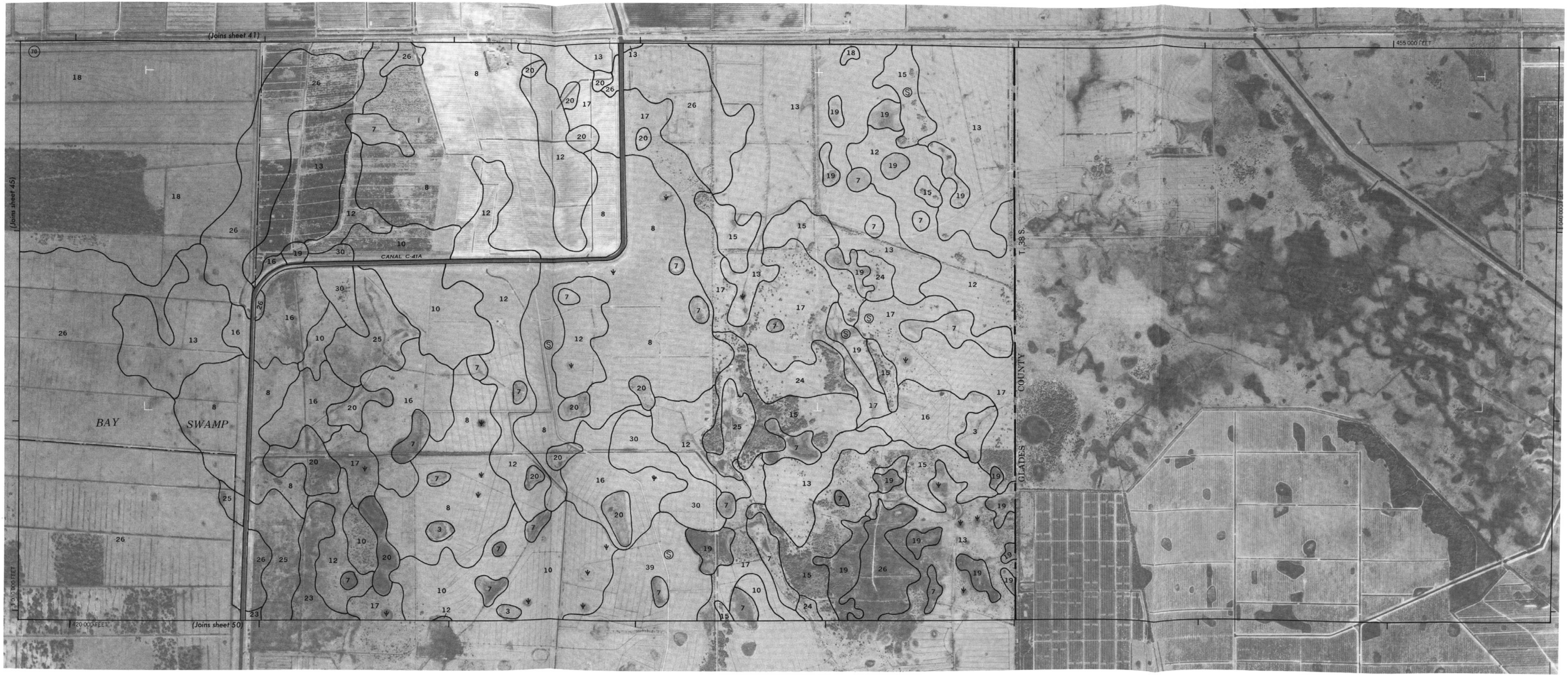
N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N

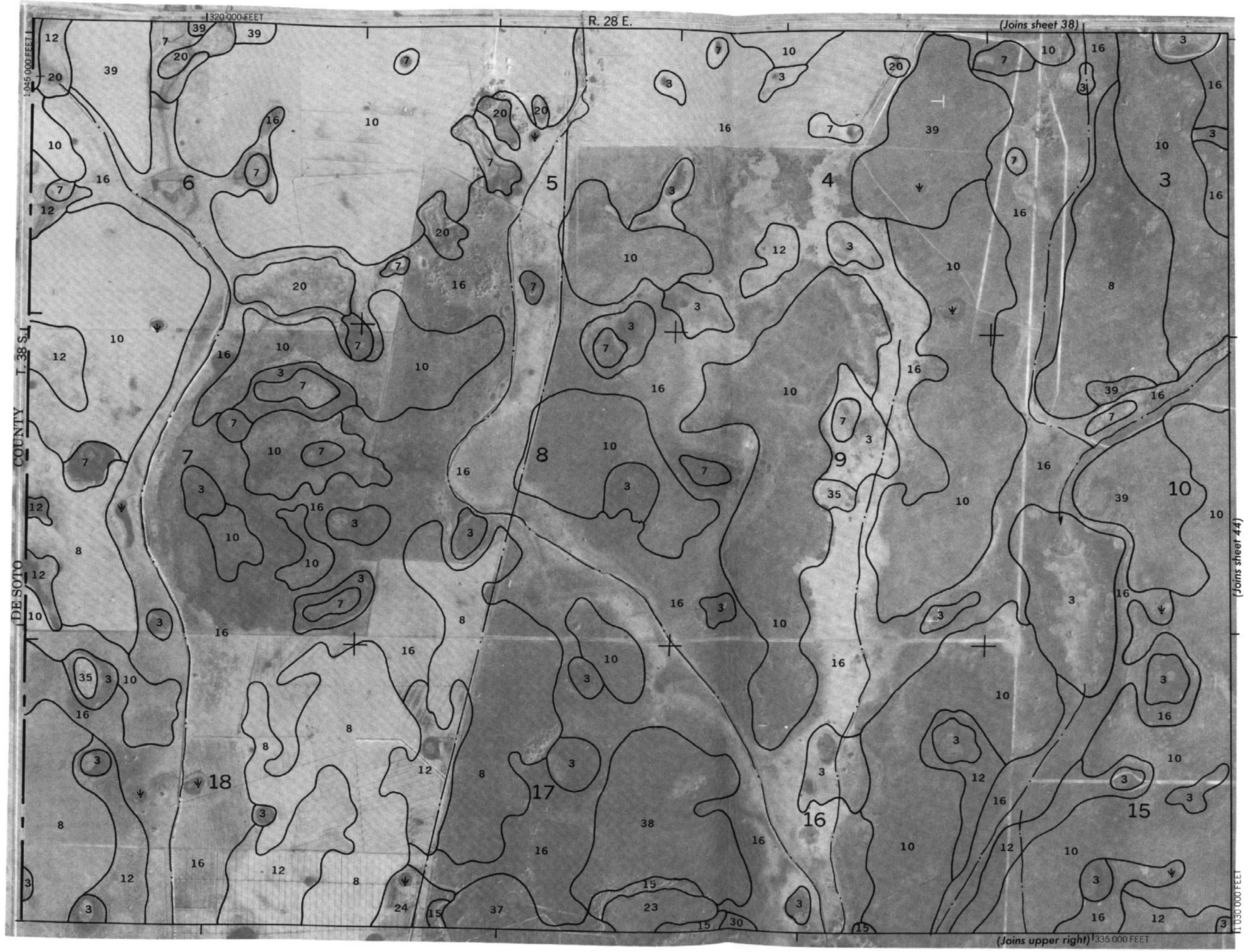


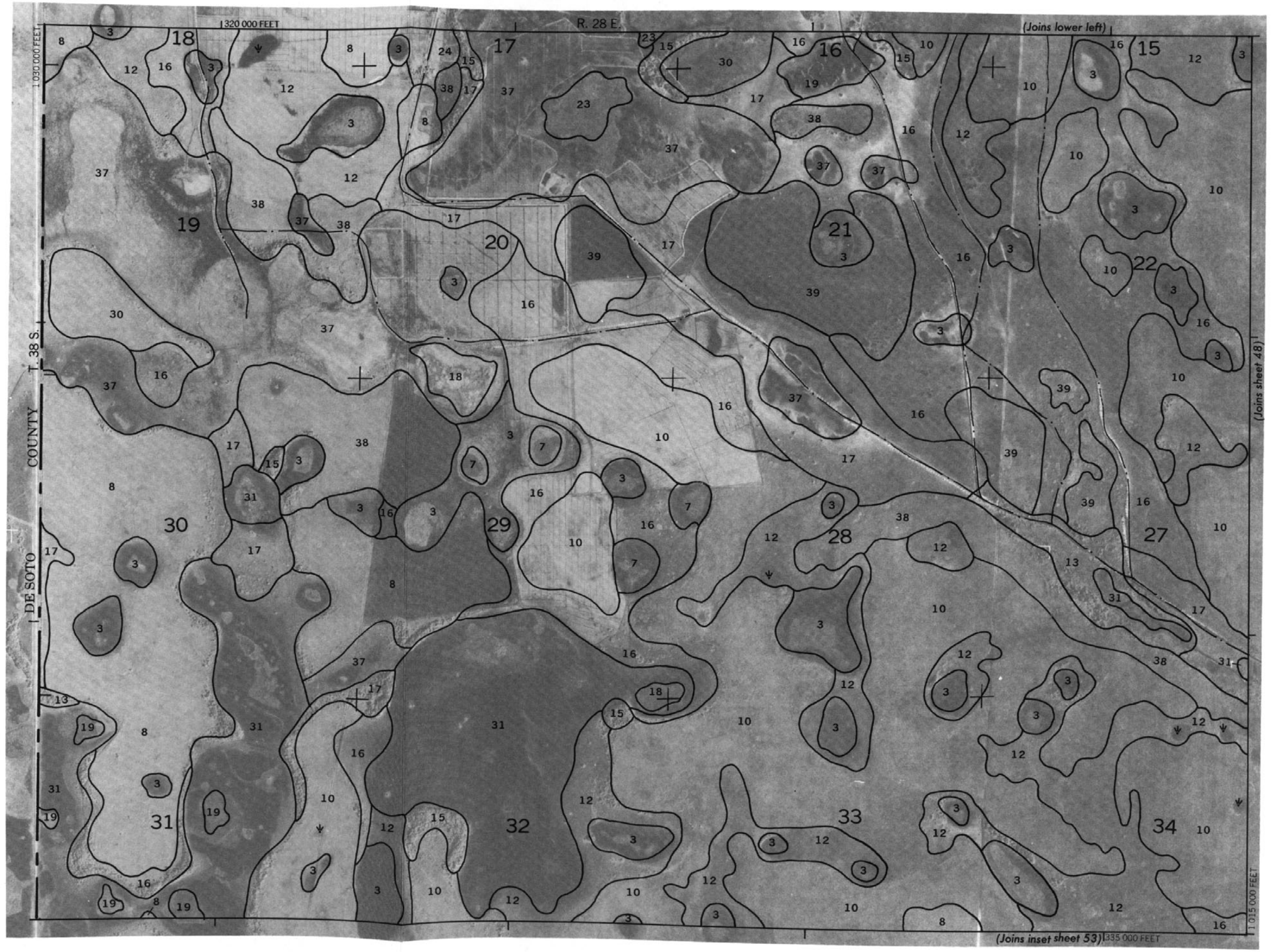
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

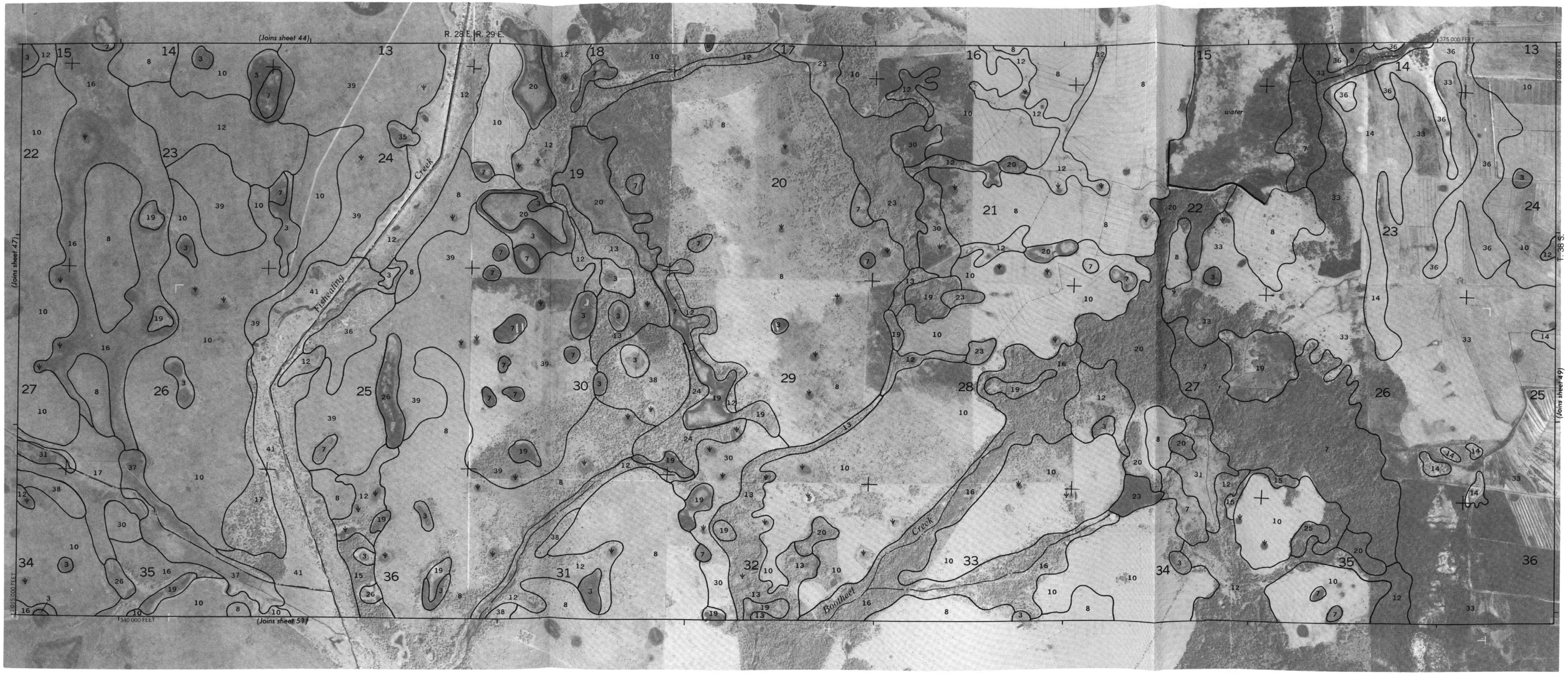
47
N





1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000

N



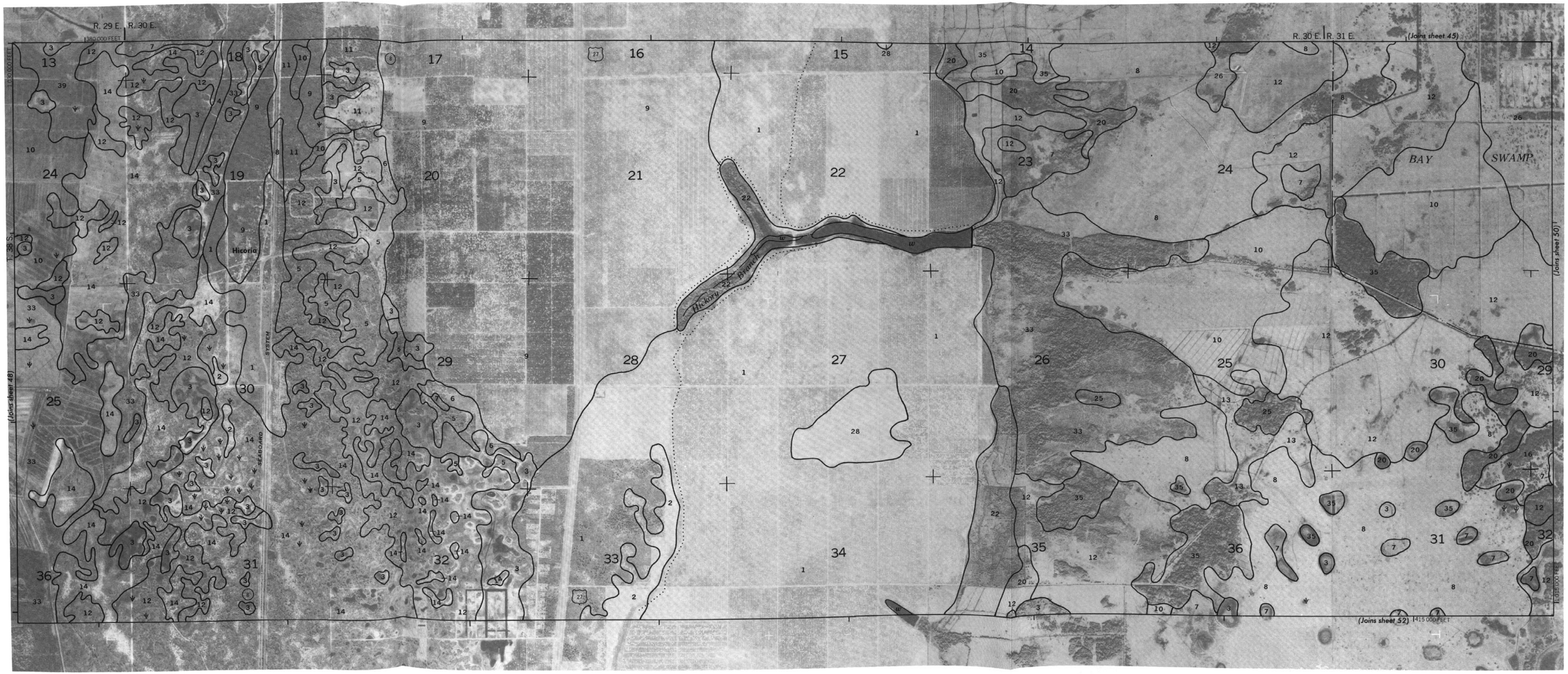
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

49

N

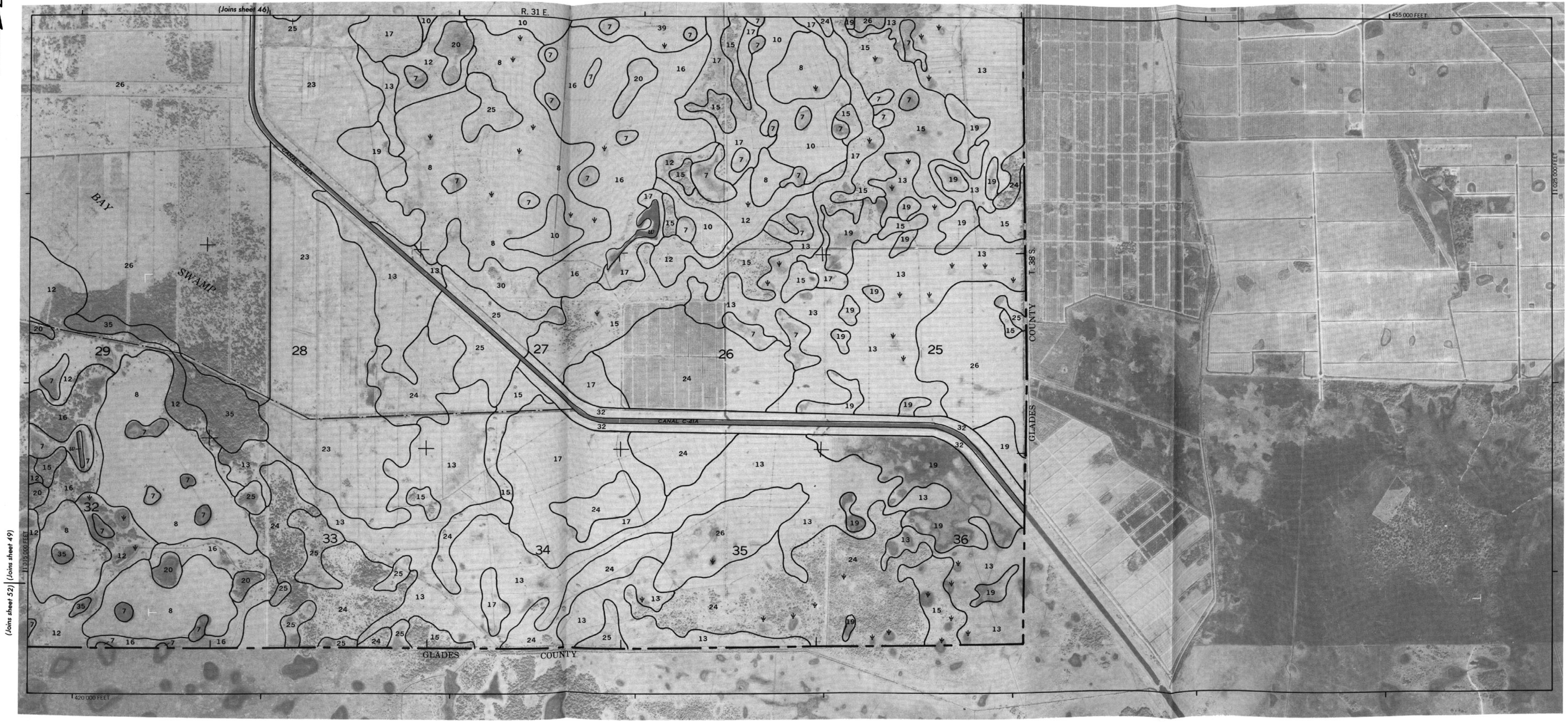


1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



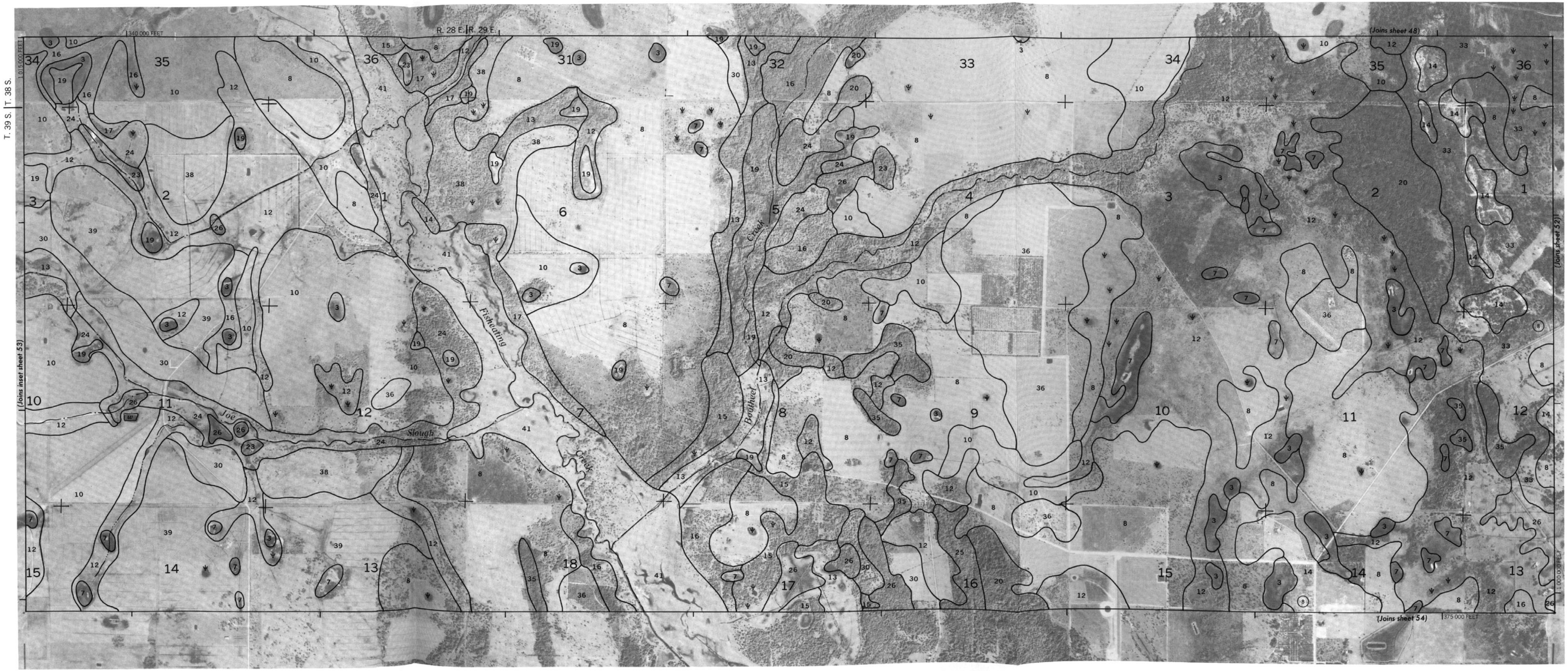
1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

51

N



1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

52

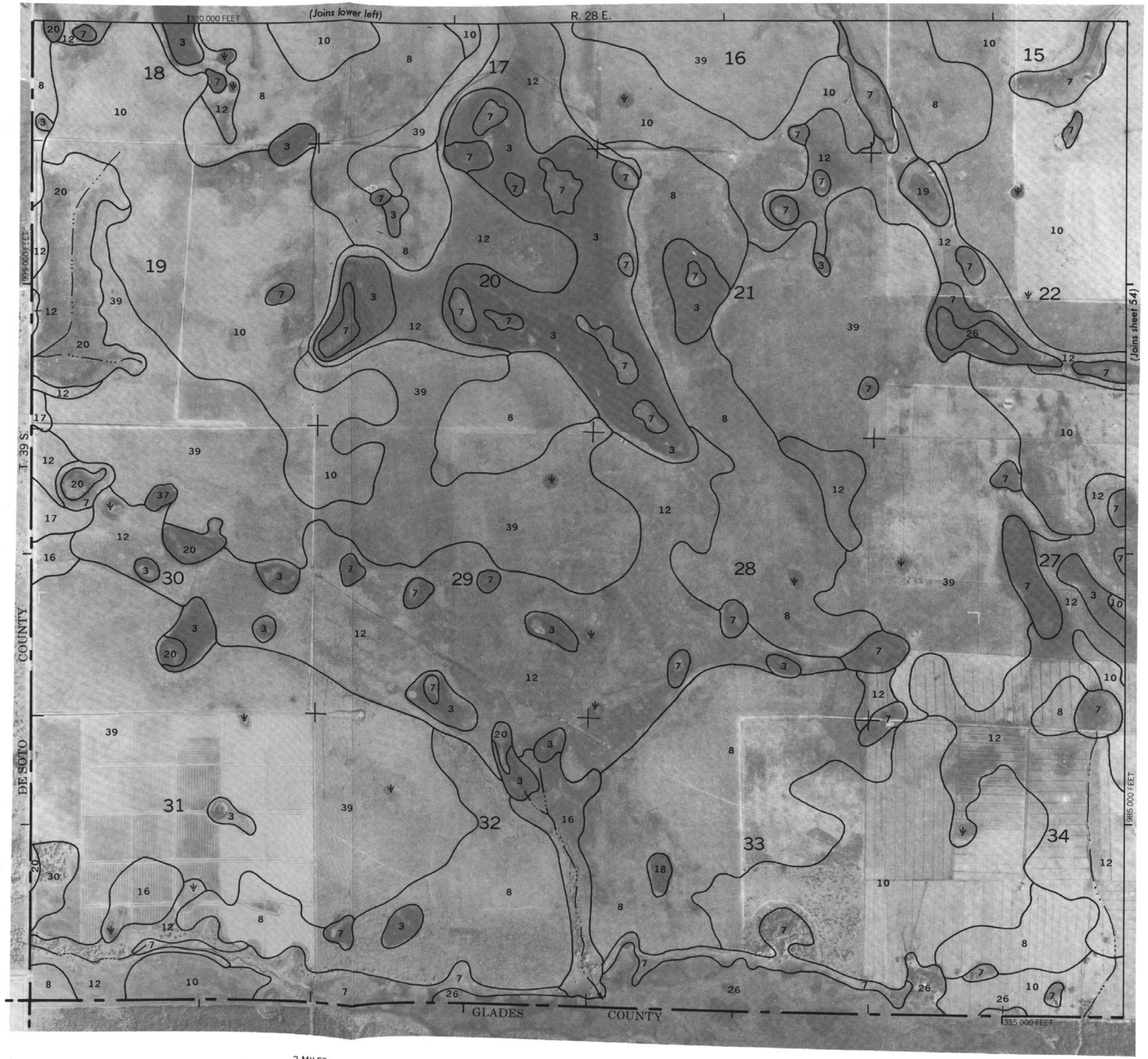
N

1 3/4 1/2 1/4 0 1 2 MILES

1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

N



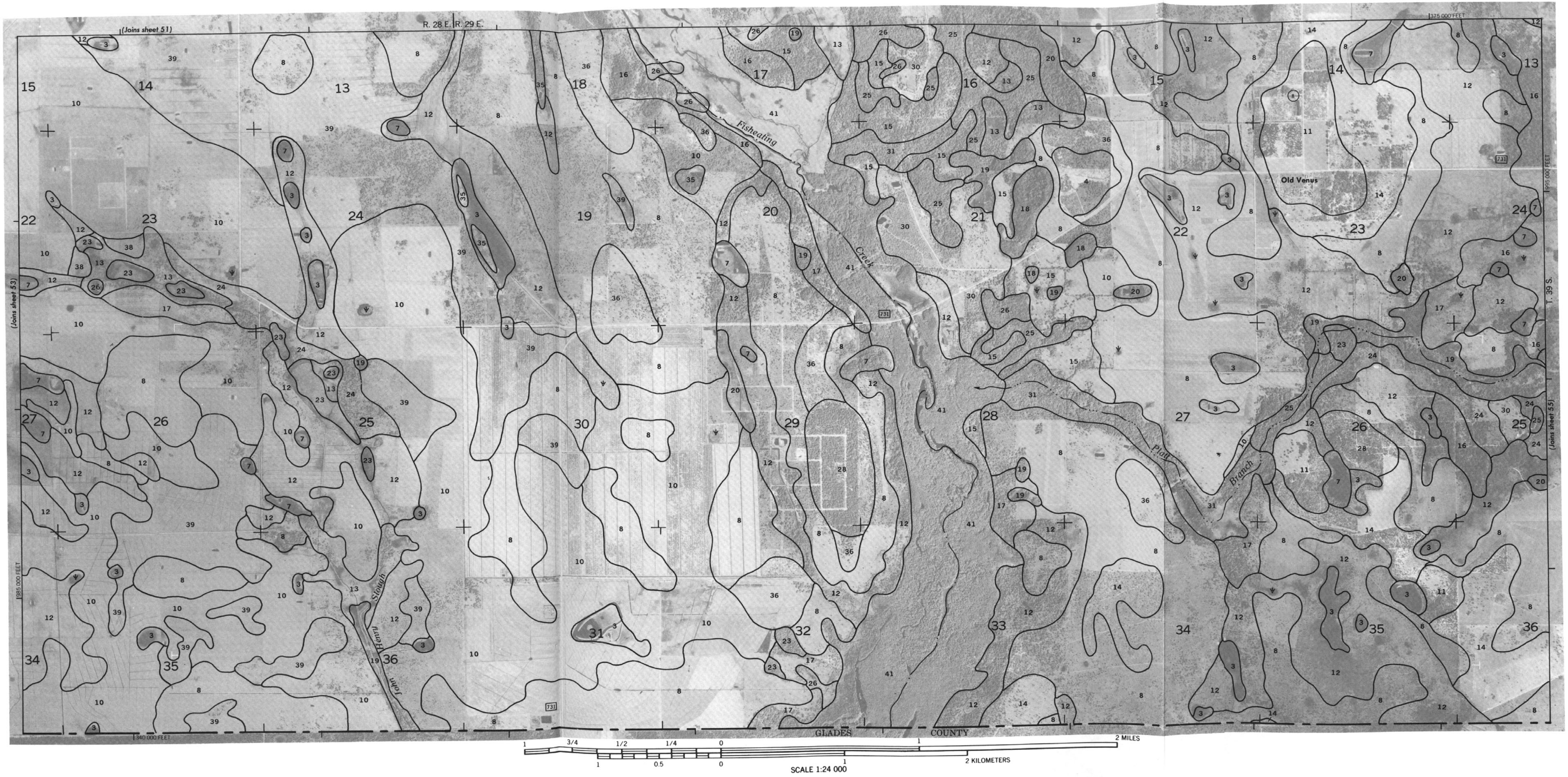
1 3/4 1/2 1/4 0 1 2 MILES

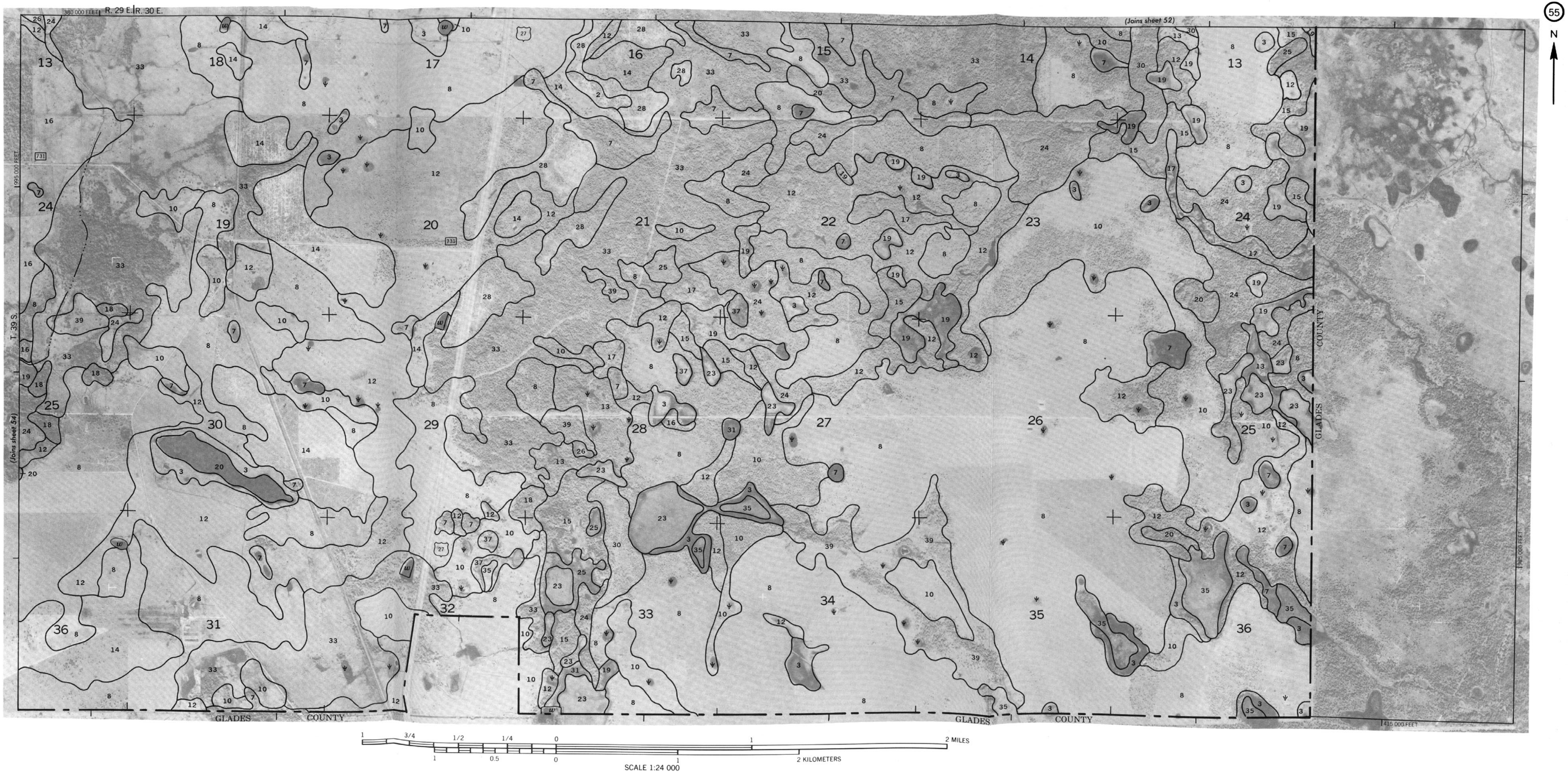
1 0.5 0 1 2 KILOMETERS

SCALE 1:24 000

54

N


(Joins sheet 51)
R. 28 E. | R. 29 E.
375 000 FEET
(Joins sheet 53)
(Joins sheet 55)
995 000 FEET
985 000 FEET
340 000 FEET
T. 39 S.
Fisheating Creek
Old Venus
Platt Branch
John Henry Slough
731
GLADES COUNTY
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000


55
N
(Joins sheet 52)
(Joins sheet 54)
380 000 FEET
R. 29 E. R. 30 E.
T. 39 S.
995 000 FEET
GLADES COUNTY
GLADES COUNTY
GLADES COUNTY
415 000 FEET
1 3/4 1/2 1/4 0 1 2 MILES
1 0.5 0 1 2 KILOMETERS
SCALE 1:24 000